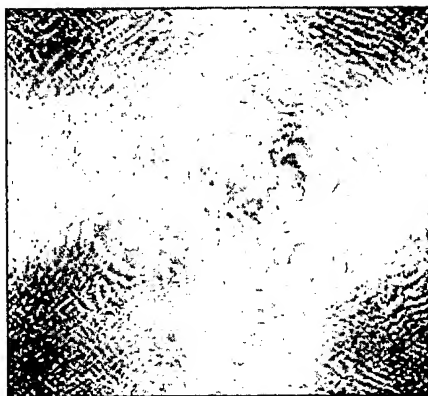


Platform Parameters

FIG. 1A



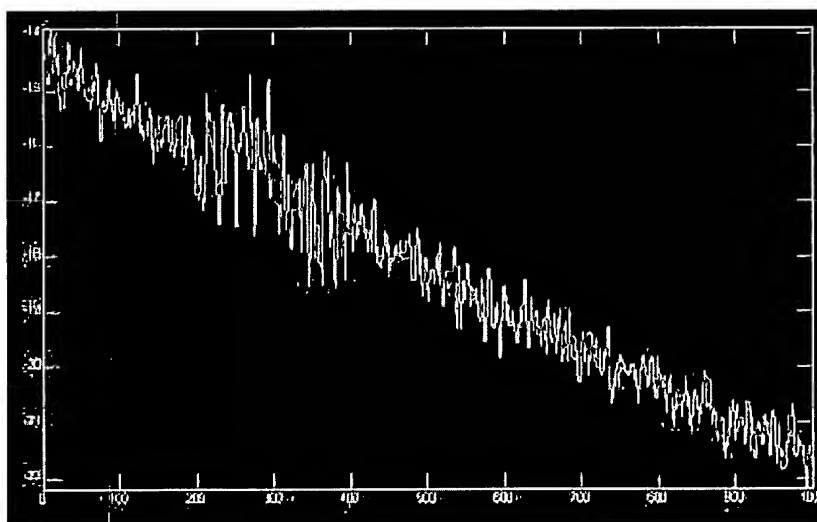
Phase Map Through Turbulence

FIG. 1B



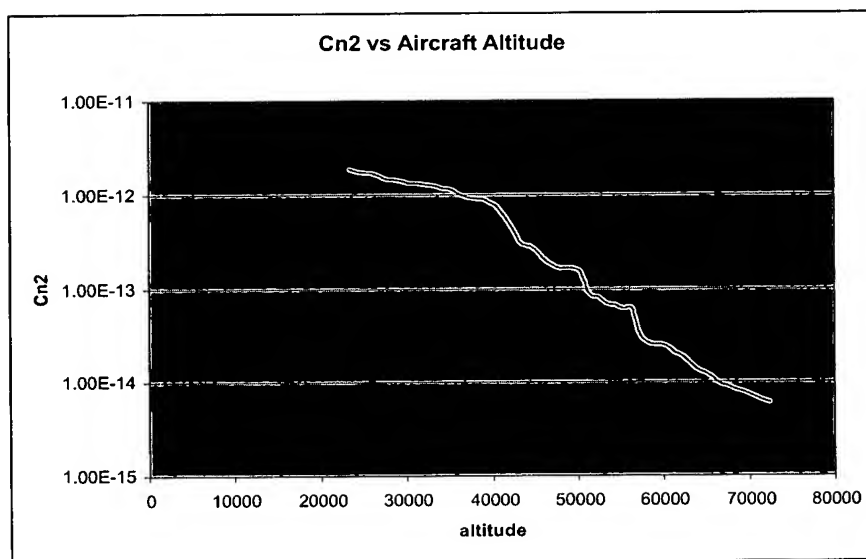
Time Sequence of Beam Distribution at Satellite  
(bar represents 10m at 1000km)

FIG. 1C



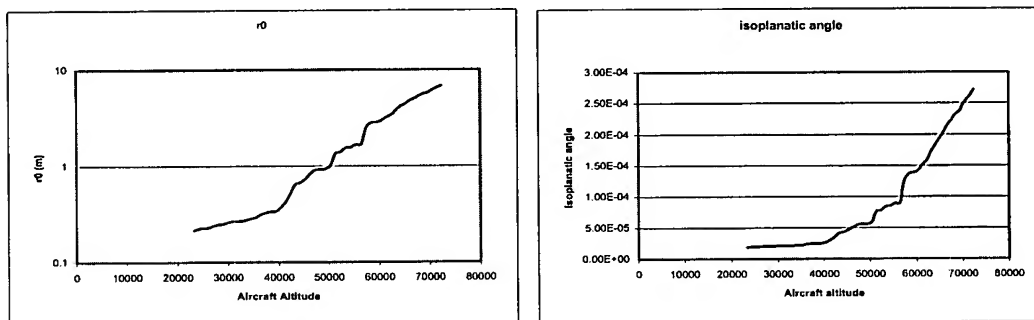
Simulated  $C_n^2$  profile

FIG. 1D



Integrated  $C_n^2$  versus aircraft altitude in feet

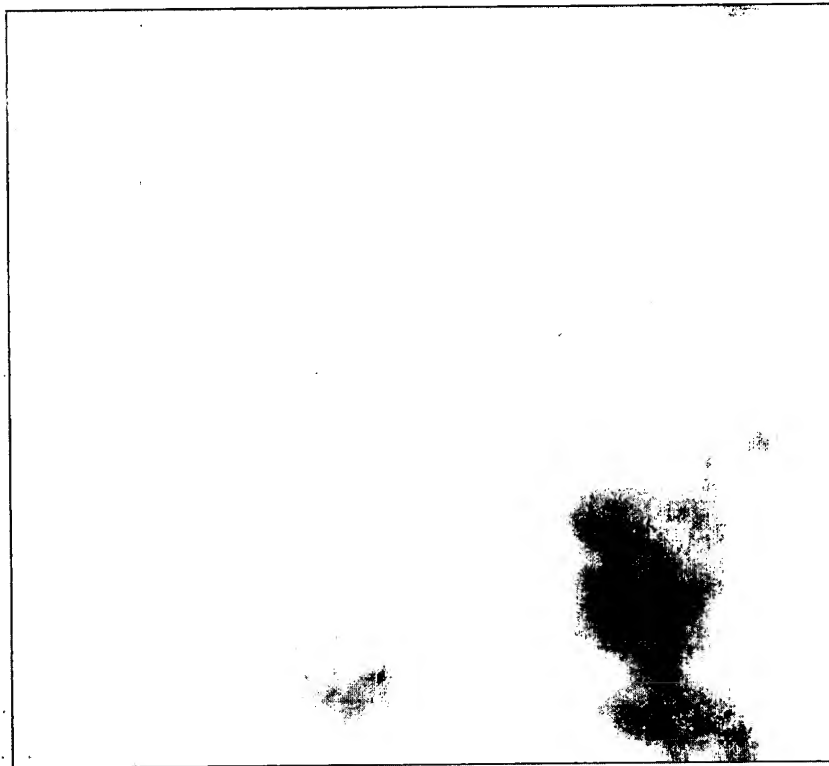
FIG. 1E



Atmospheric coherence parameters versus aircraft altitude

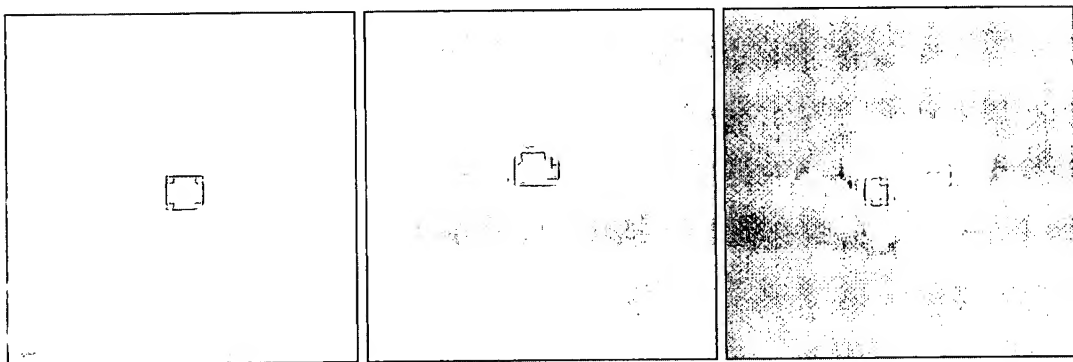
FIG. 1F1

FIG. 1F2



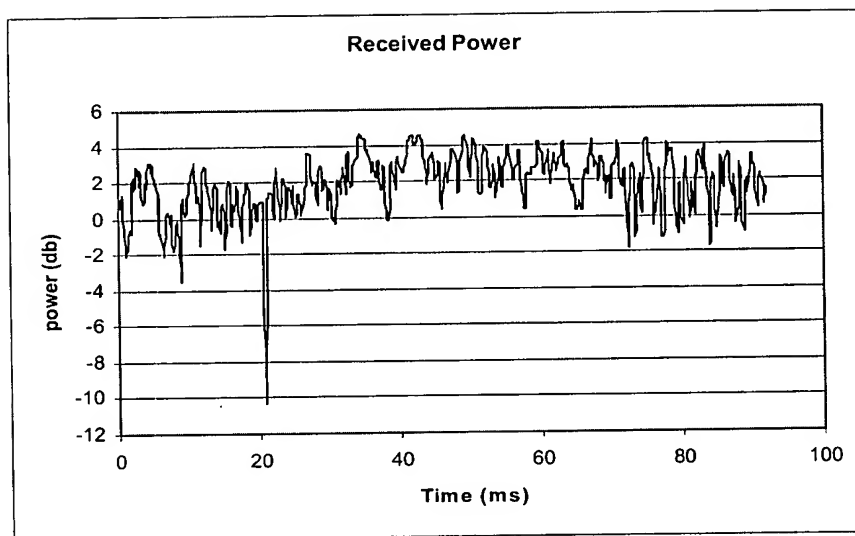
Simulated turbulence induced phase error

FIG. 1G



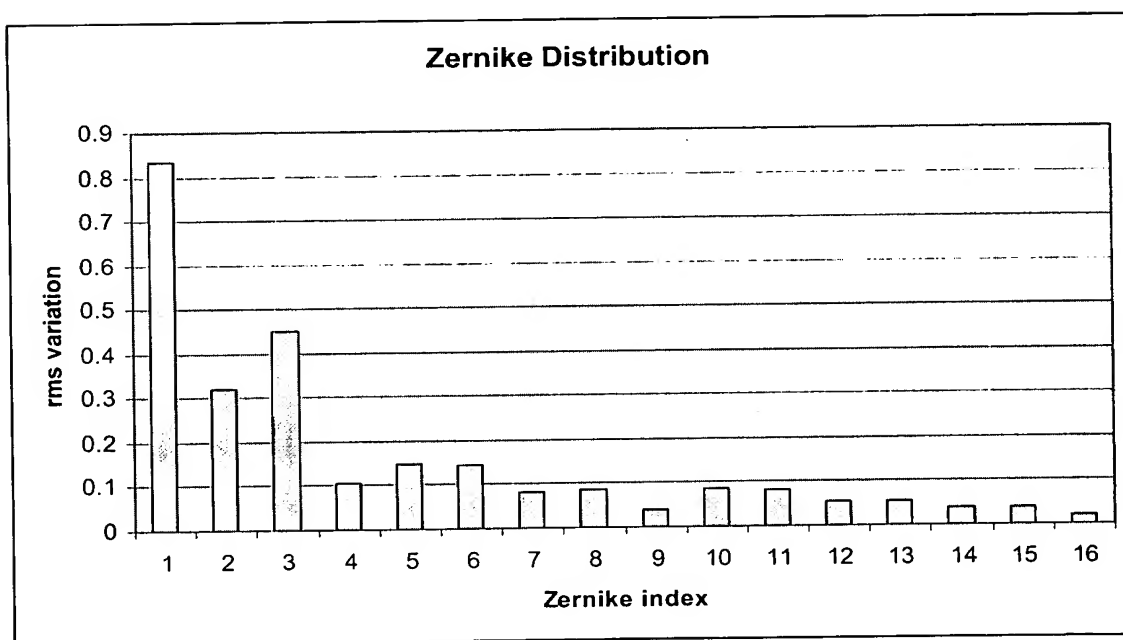
Diffraction limited beam profile (left) and typical beam profiles at satellite

FIG. 1H



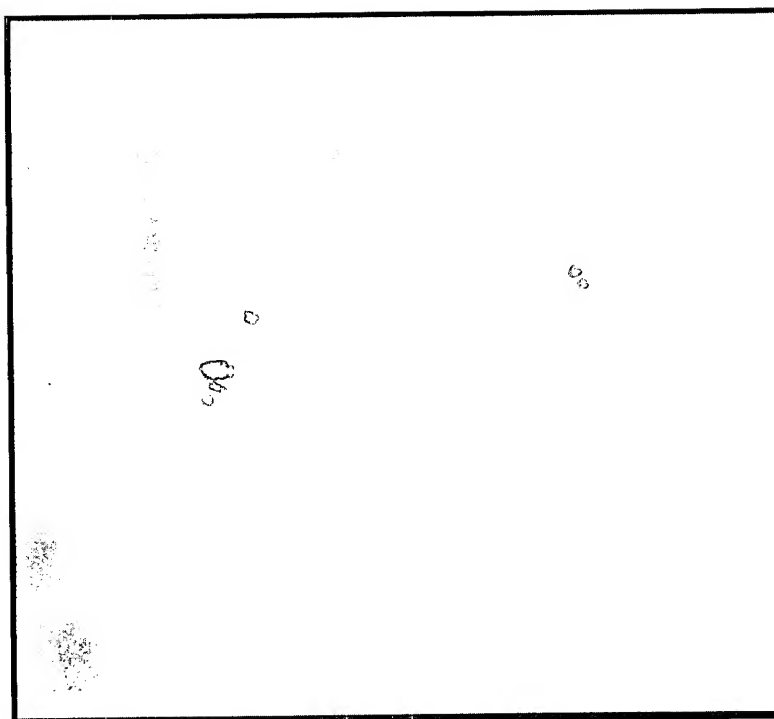
Time Series of Received Power

FIG. 1I



Temporal Variation in Lowest 15 Zernike terms

FIG. 1J



Intensity distribution at receiver aperture

FIG. 1K



Spot during a deep fade event

FIG. 1M



Typical calculated spot at detector plane

FIG. 1L

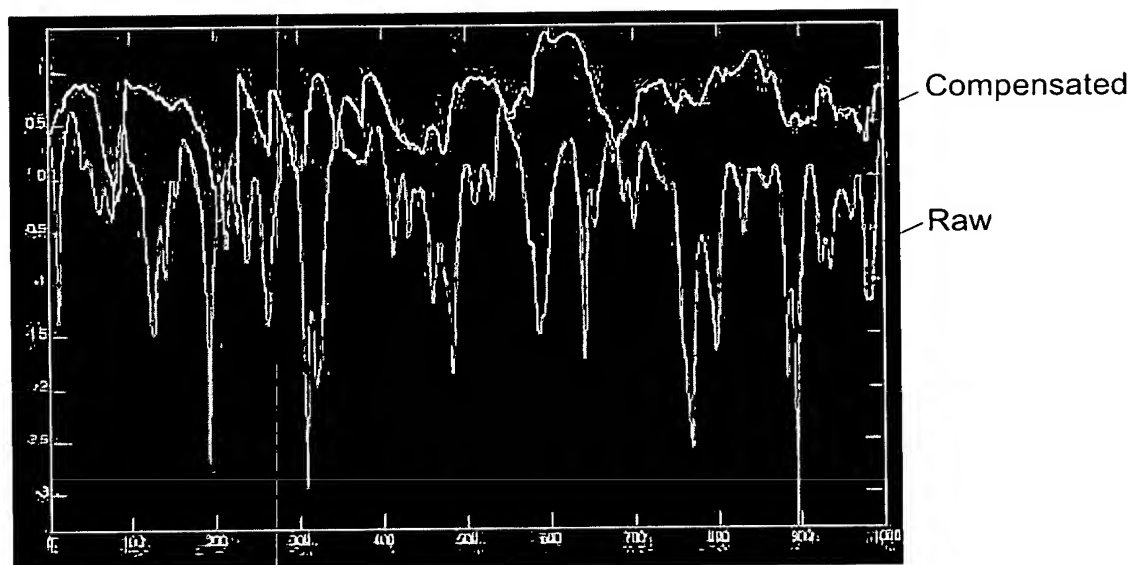


FIG. 1N

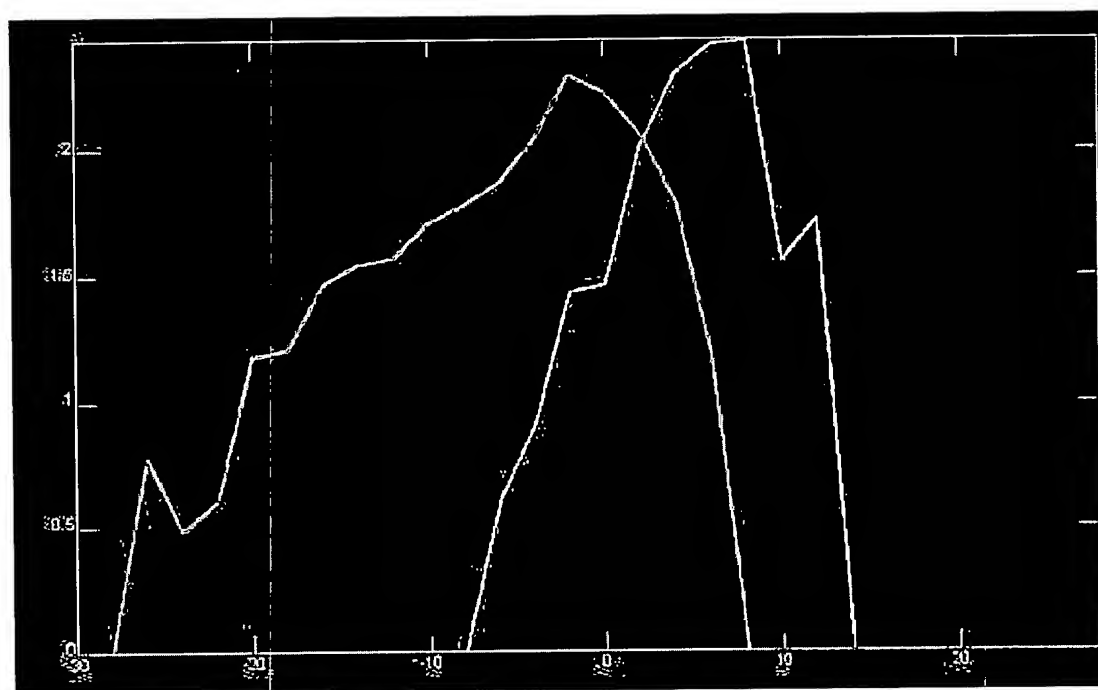
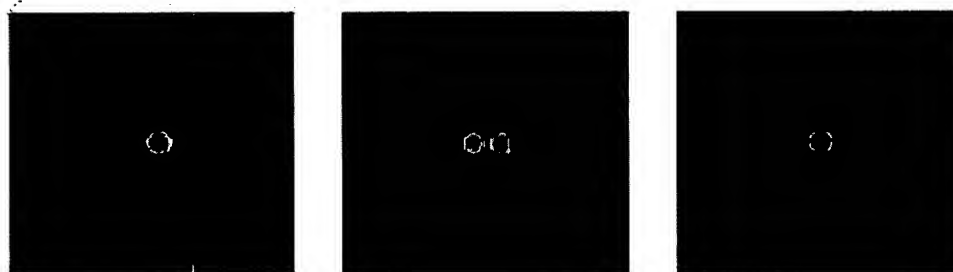


FIG. 1O



Blur spots formed by aperture with 0.2, 0.5, and 1.0 wave phase steps

FIG. 1P



Modulation of a speckle pattern by a phase step

FIG. 1Q

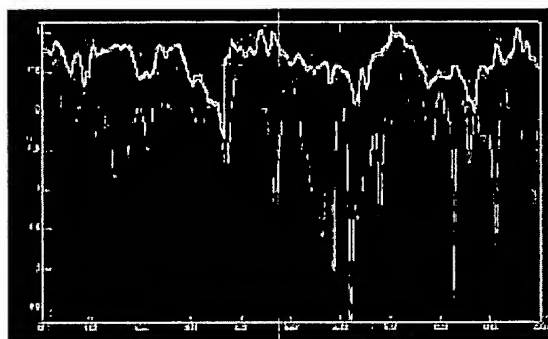


FIG. 1R1

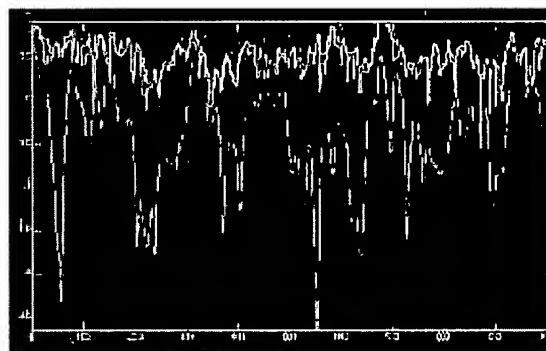
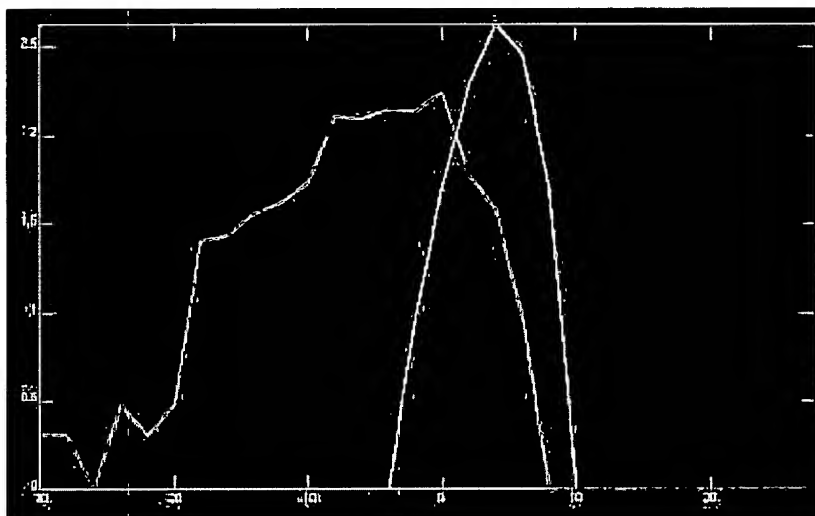


FIG. 1R2

Log intensity vs. iteration number.  
Left, 2X2 phase modulator; right, 4X4 phase modulator.



PDF for the data in Fig. 9K2

FIG. 1S

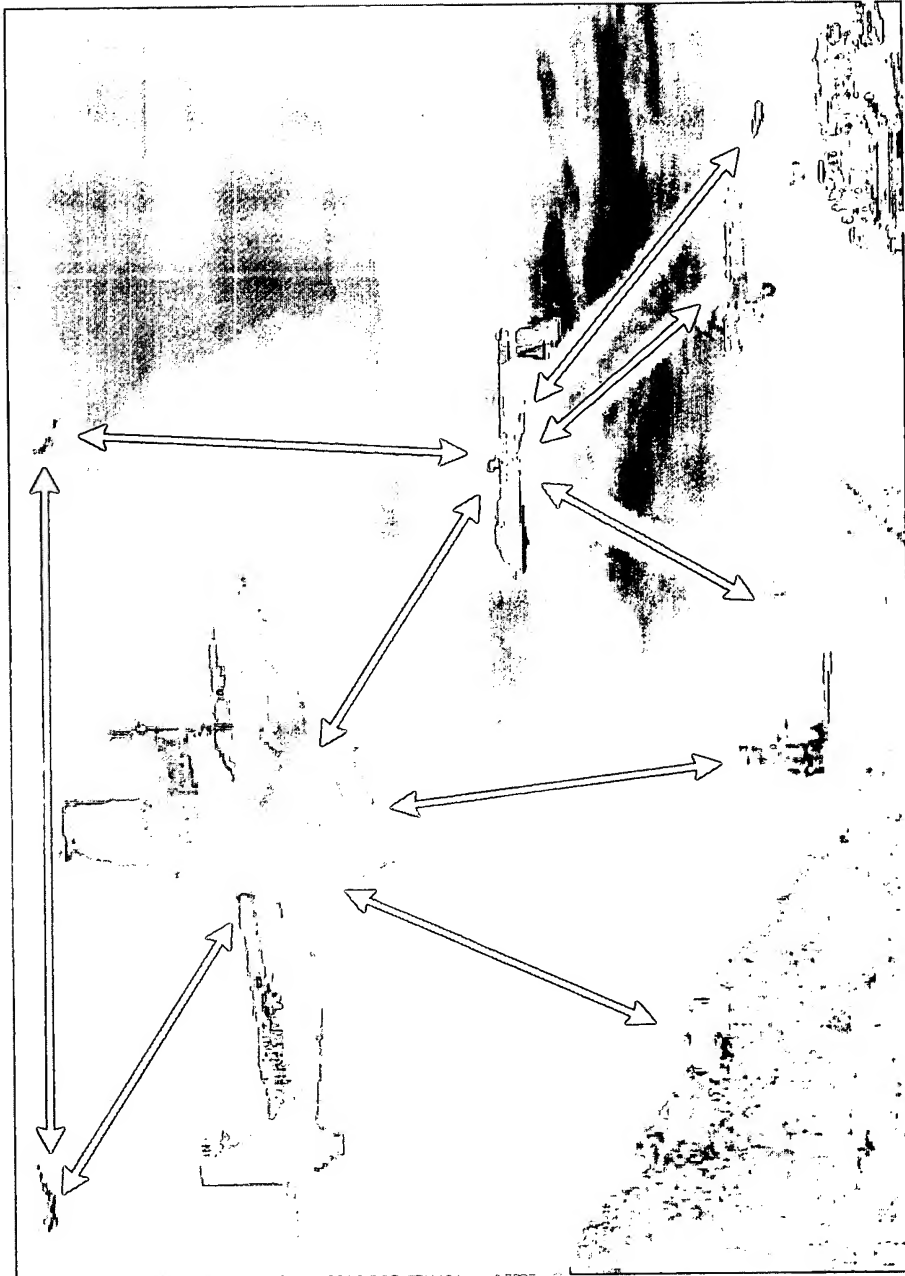


FIG. 2A

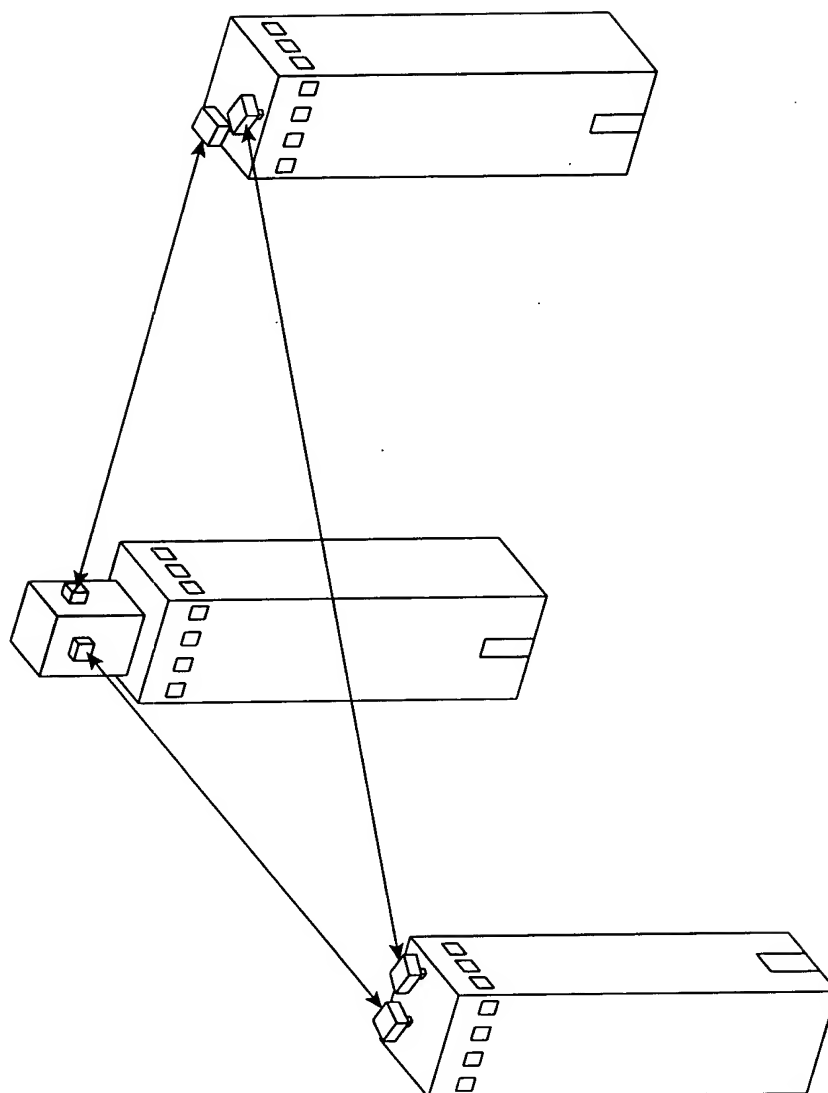


FIG. 2B

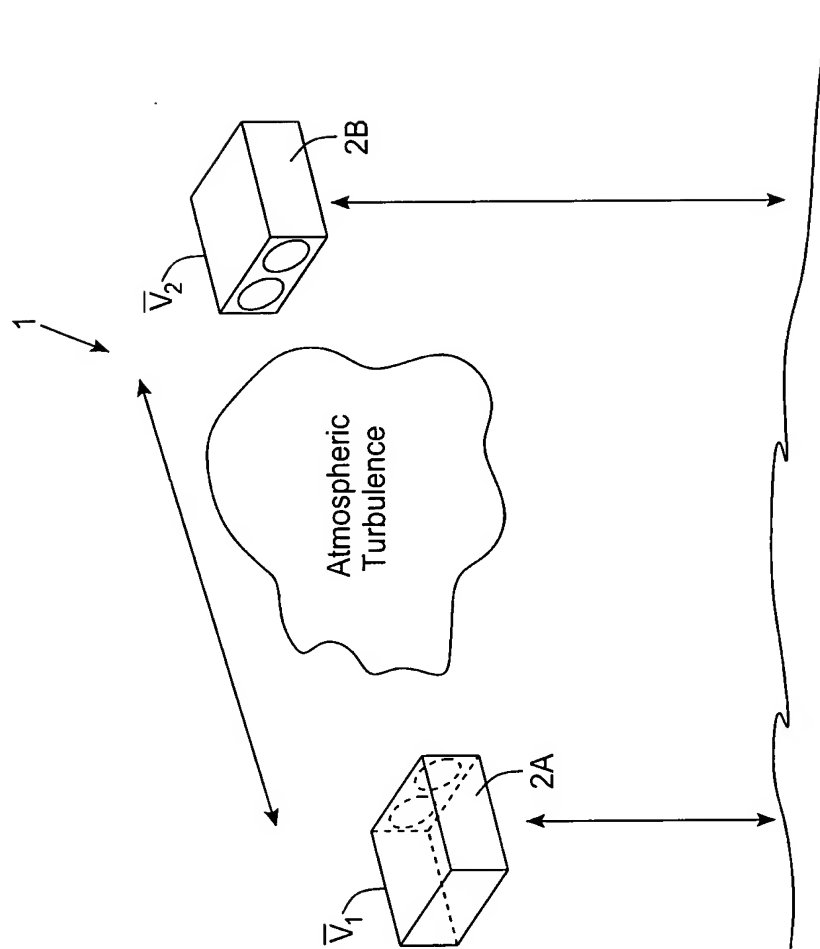


FIG. 3A

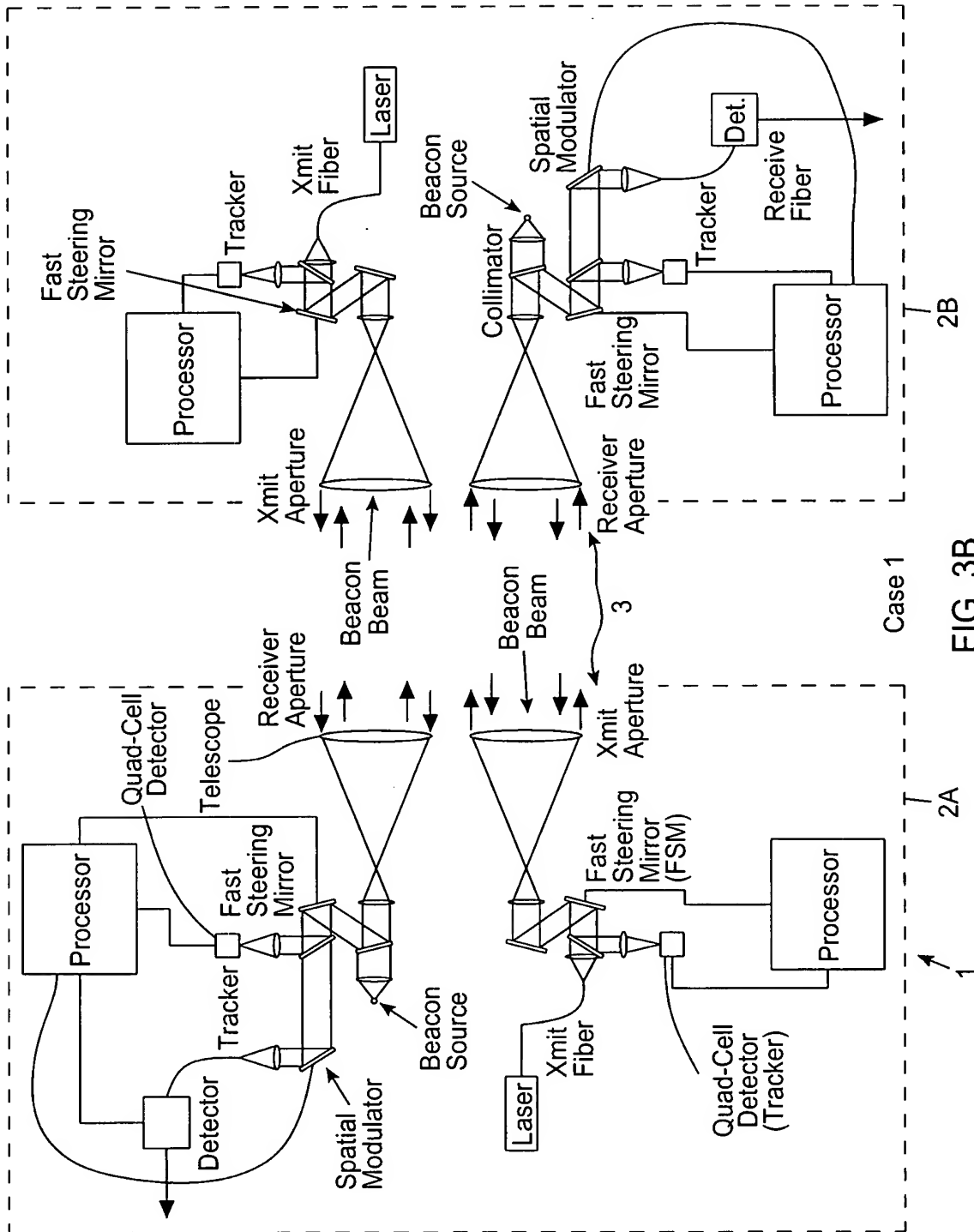


FIG. 3B

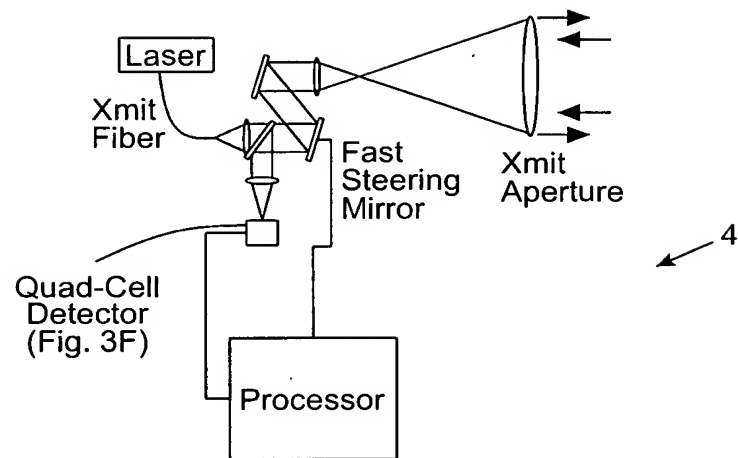


FIG. 3C

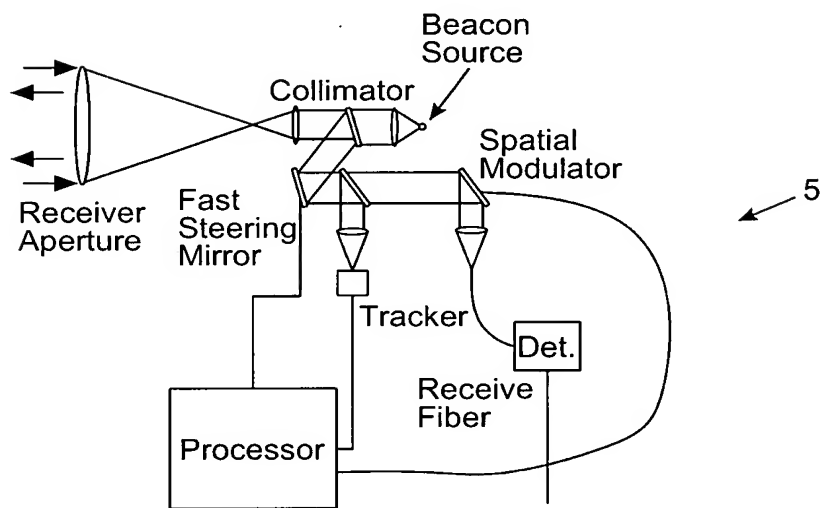


FIG. 3D

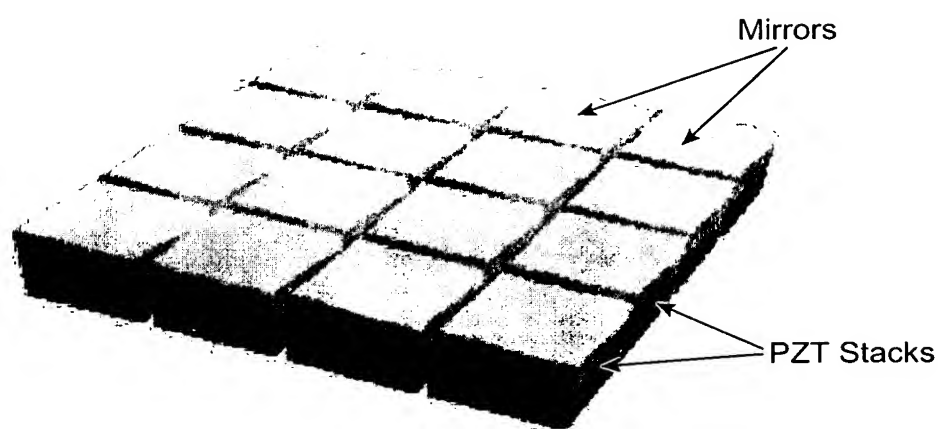


FIG. 3E

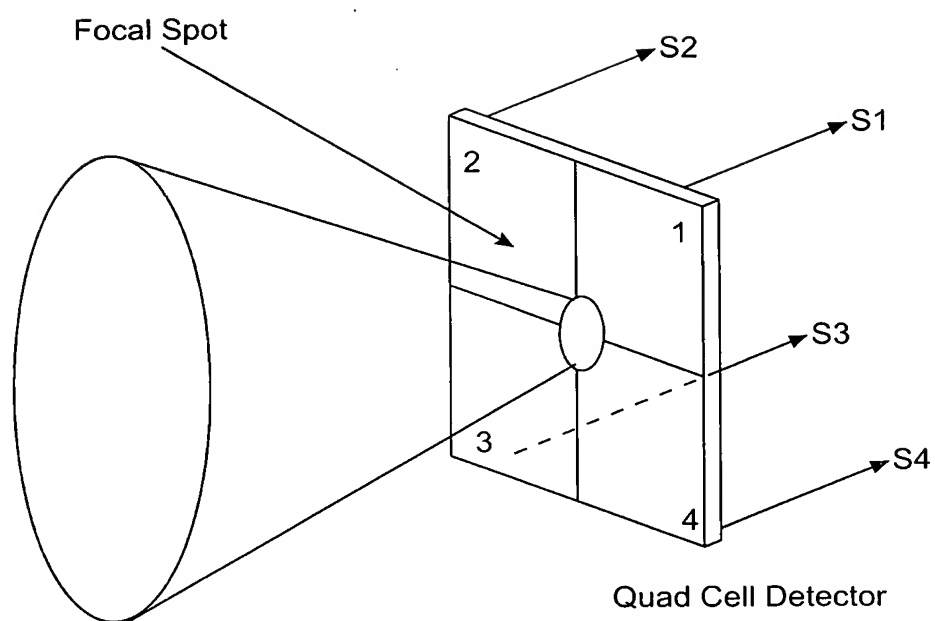
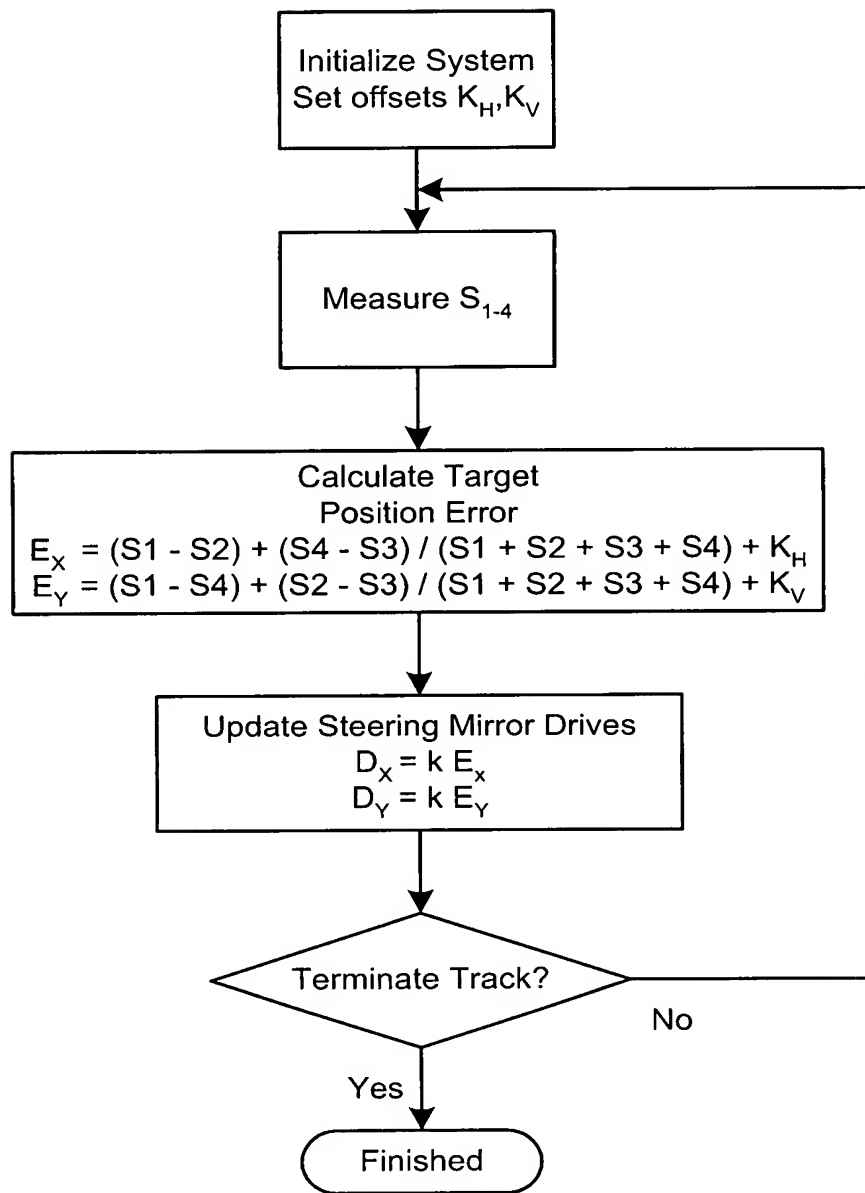


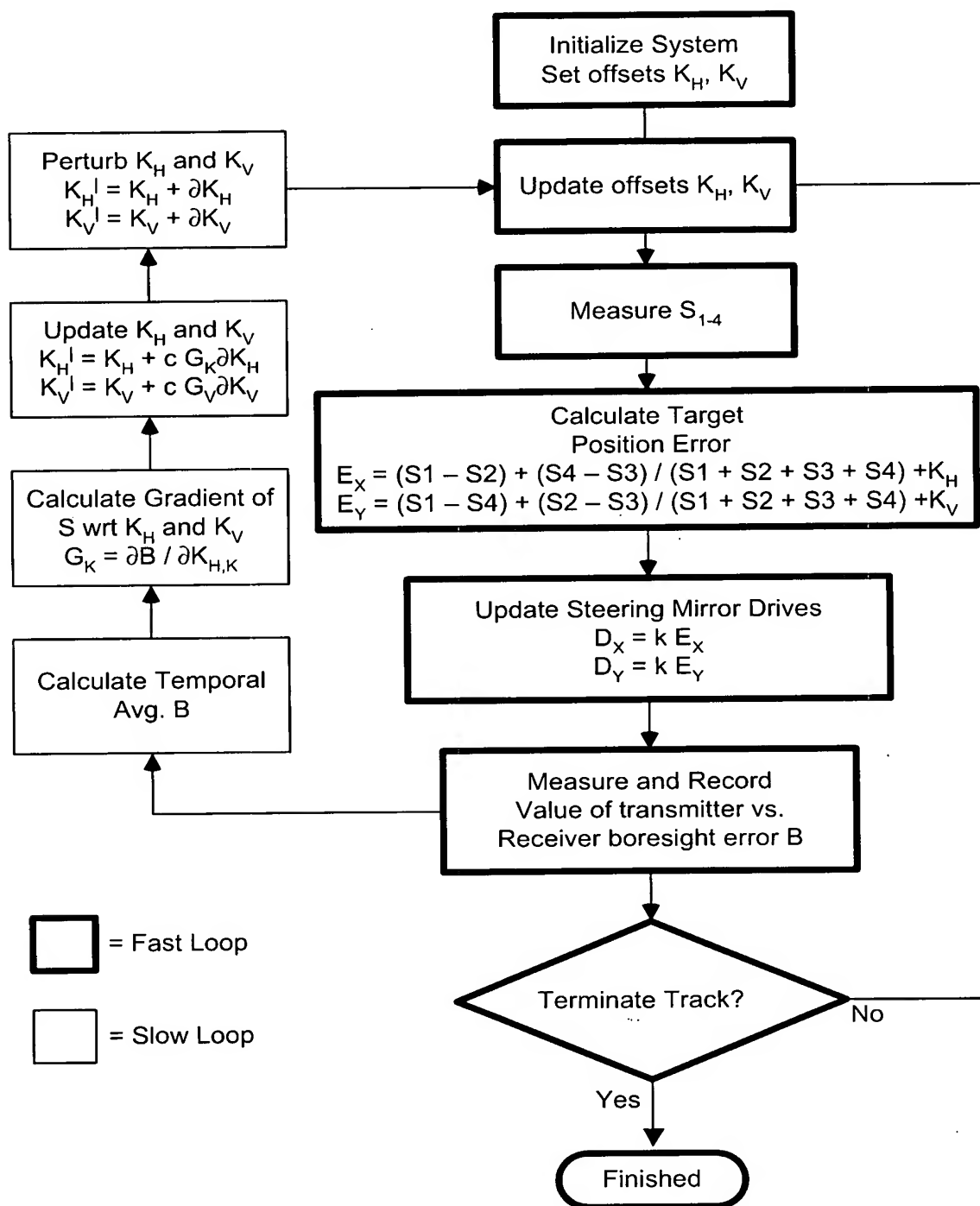
FIG. 3F



Proportional Control

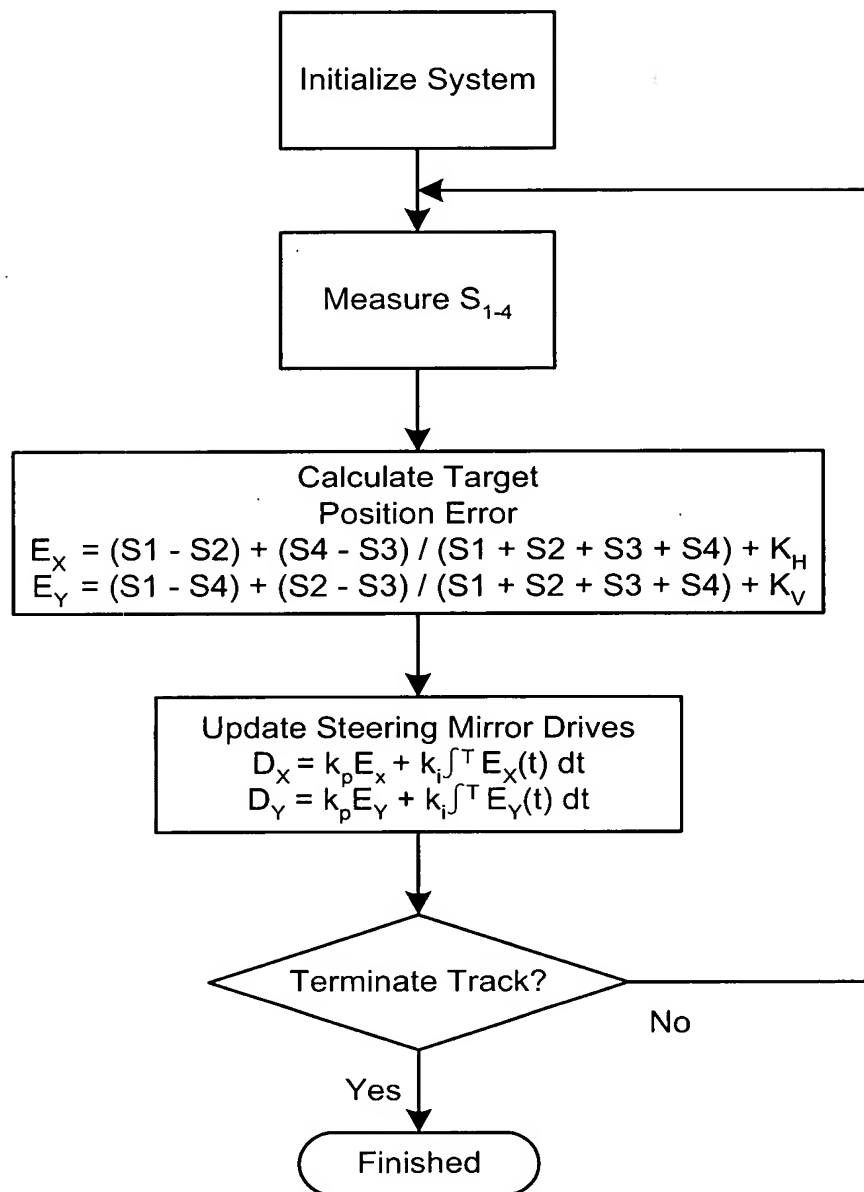
Transmitter

FIG. 4A



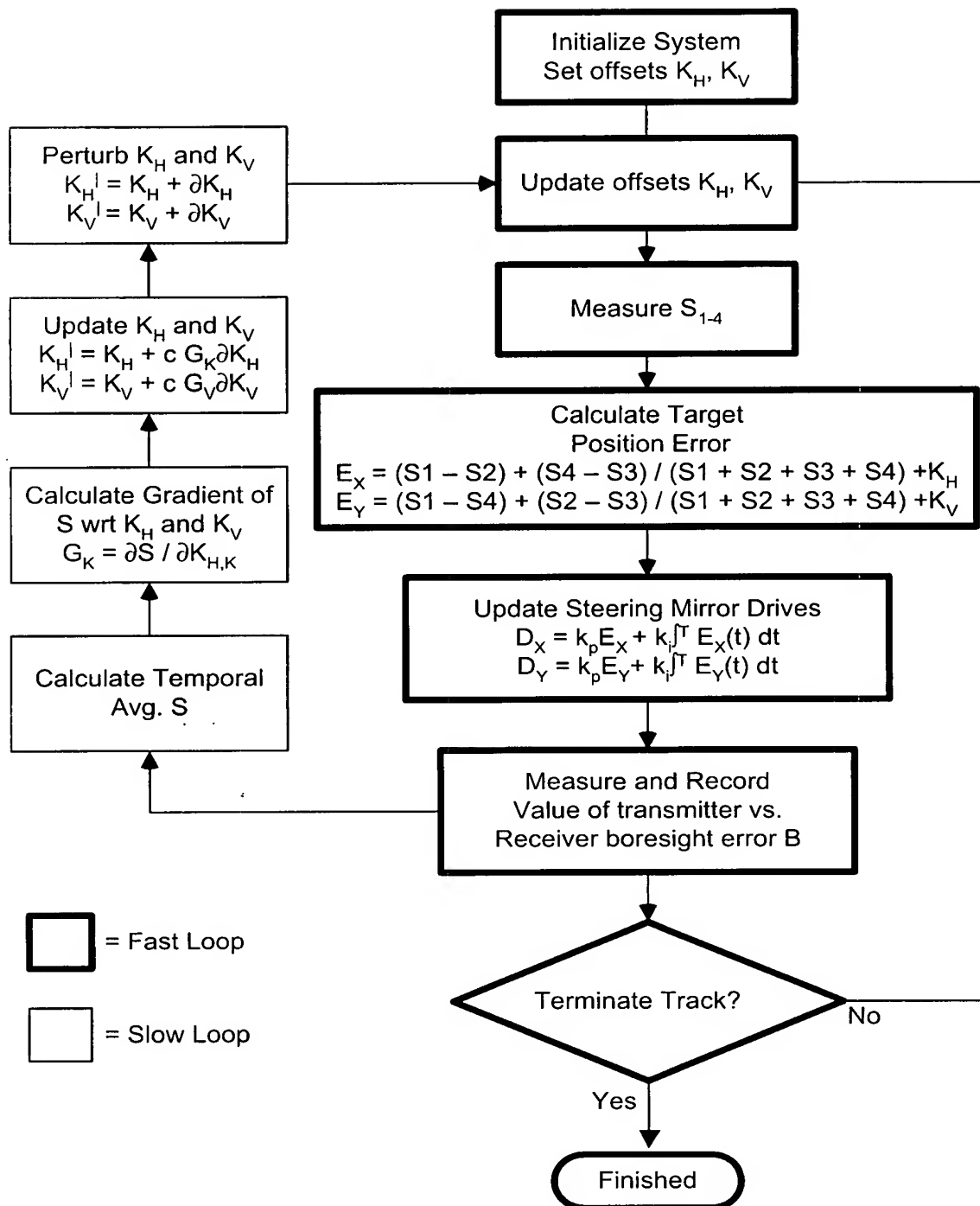
Transmitter Proportional Control

FIG. 4A'



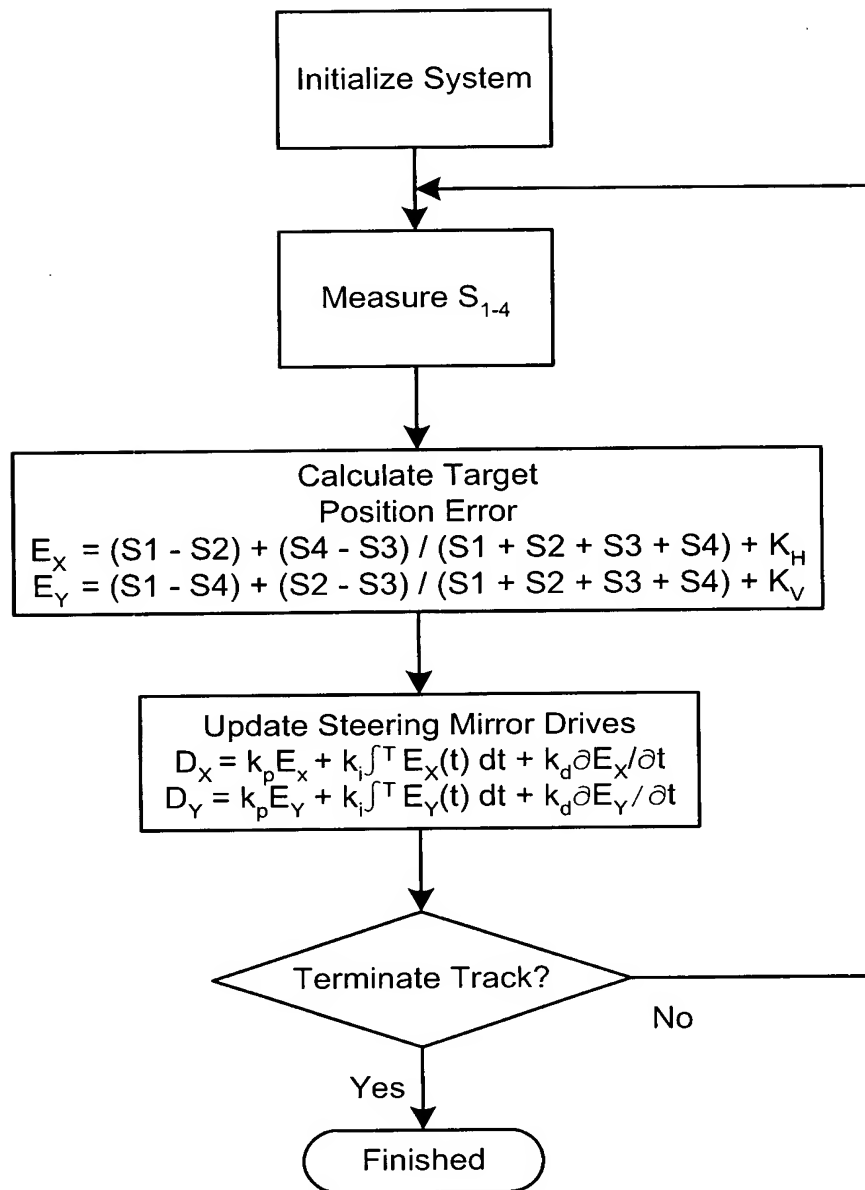
Proportional Plus Integral Control

FIG. 4B



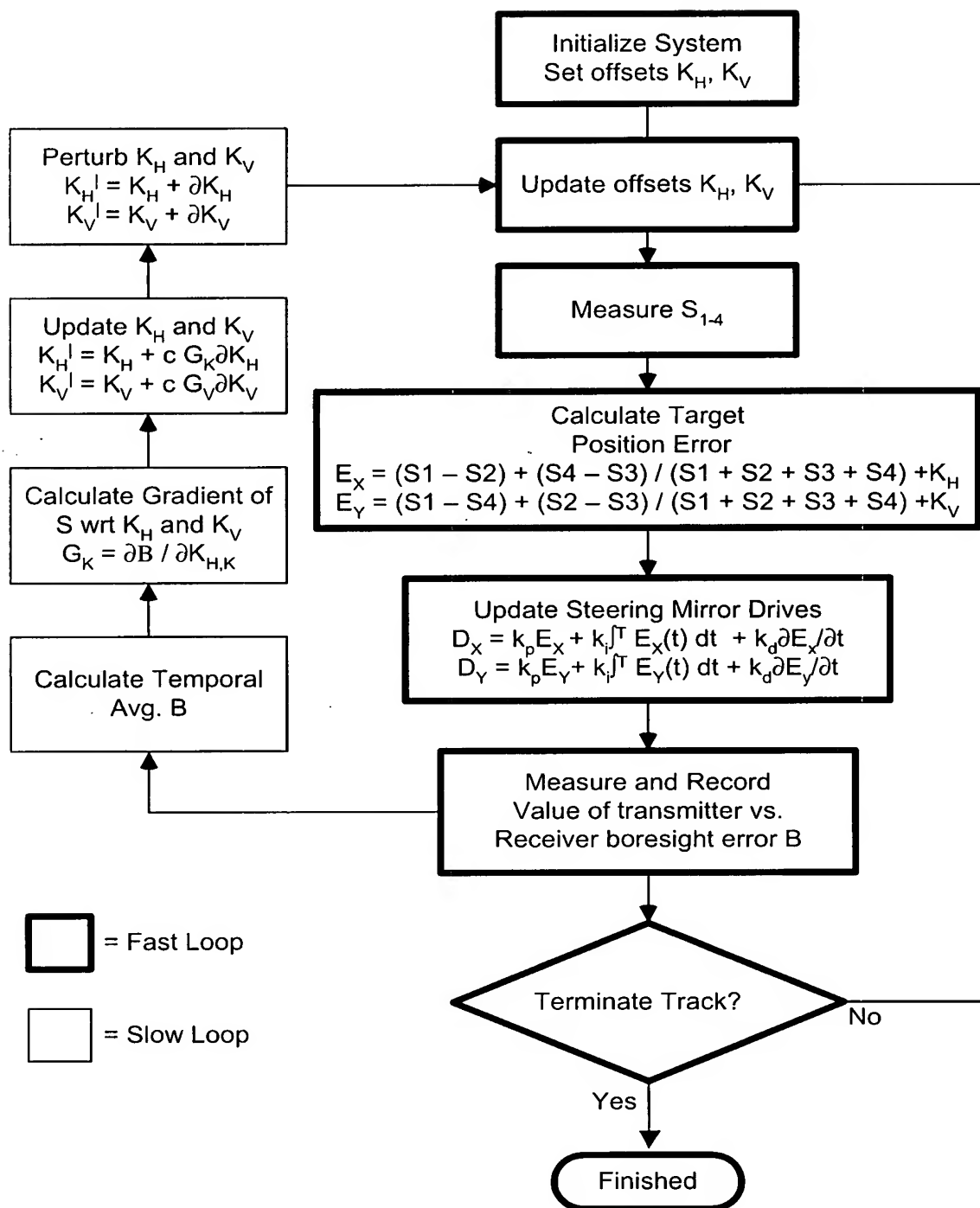
Transmitter Proportional plus Integral Control

FIG. 4B'



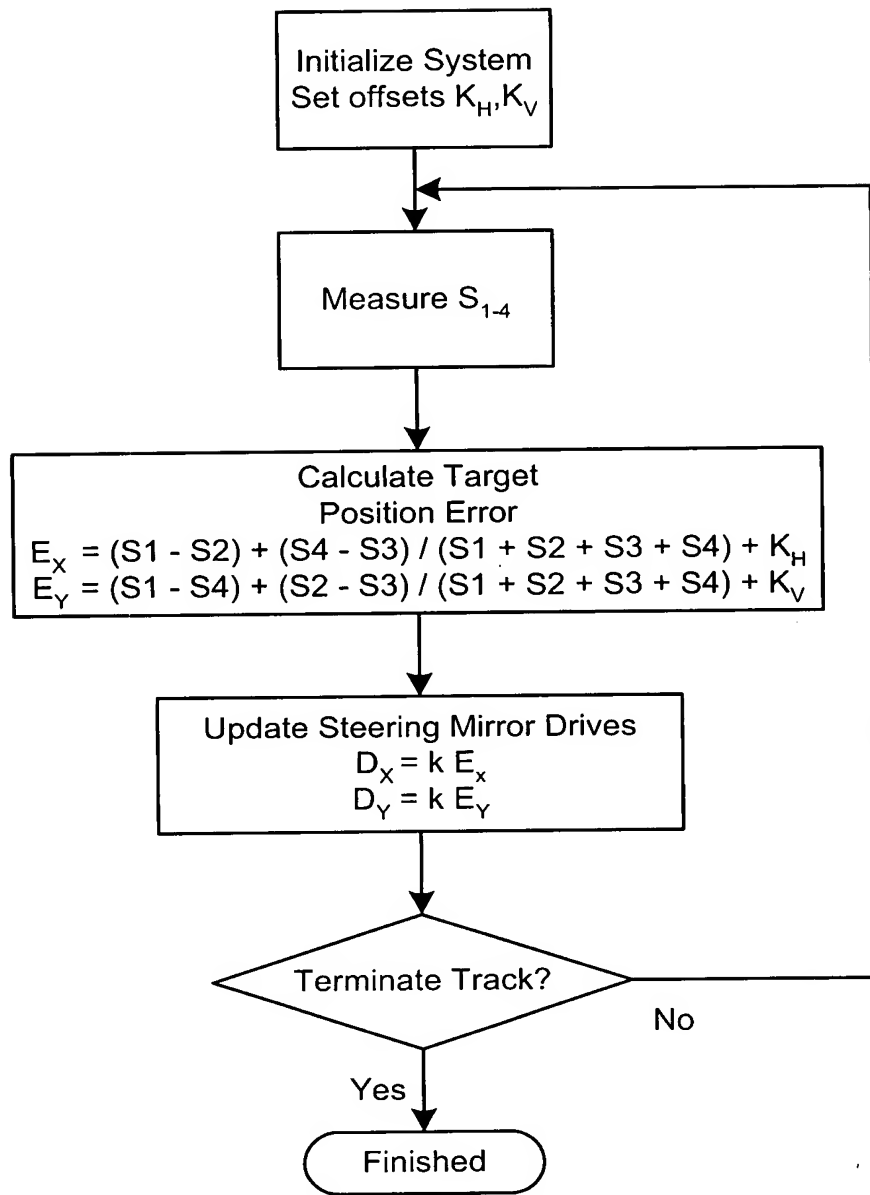
Proportional Plus Integral Control Plus Derivative

FIG. 4C



Transmitter Proportional plus Integral Control plus Derivative

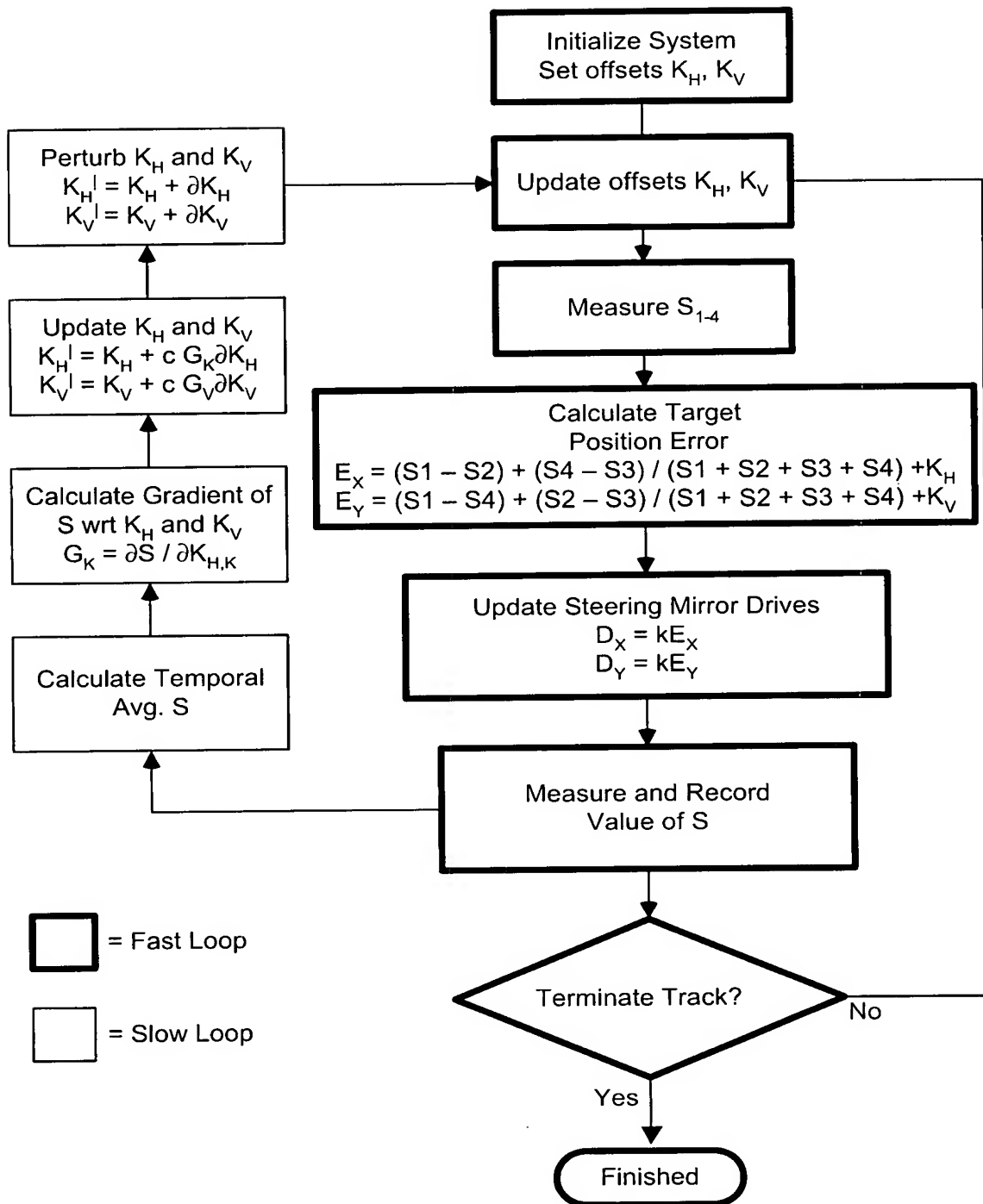
FIG. 4C'



Proportional Control

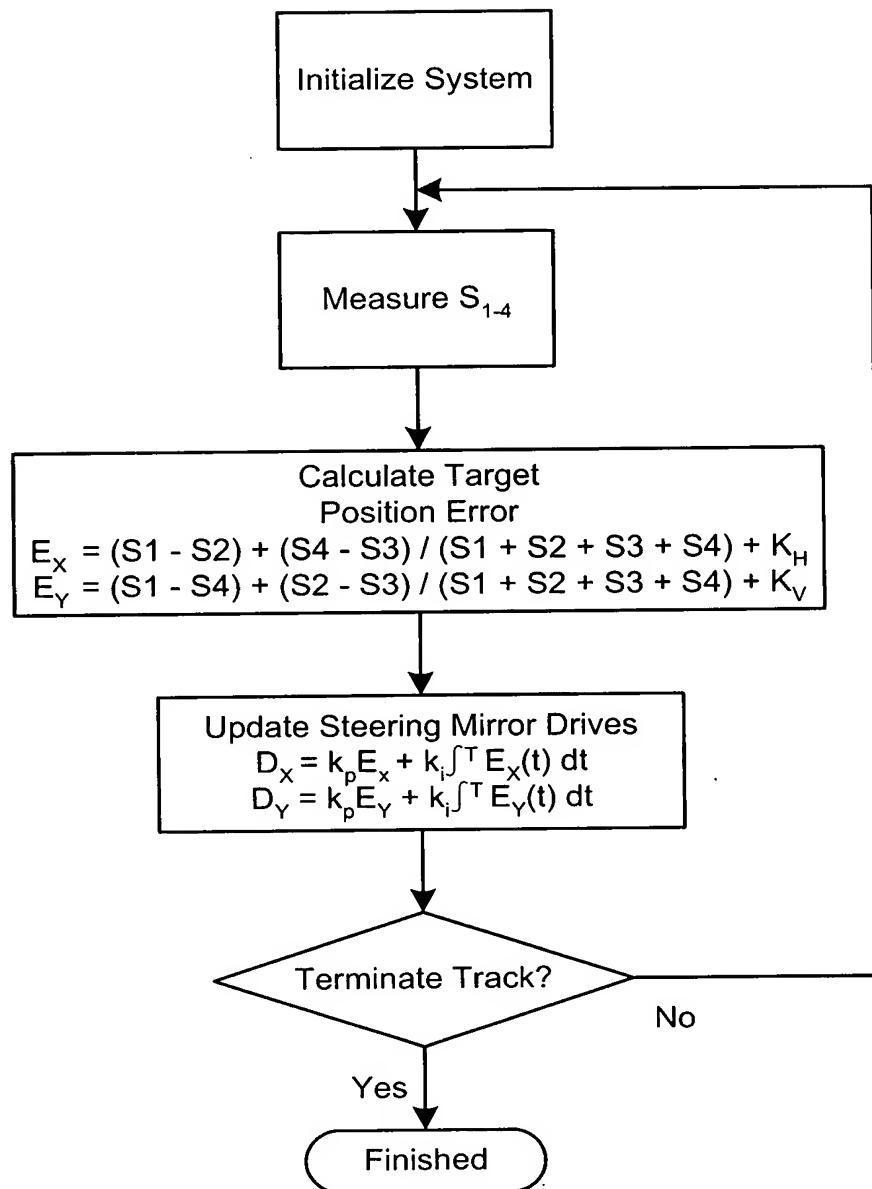
Receiver

FIG. 4D



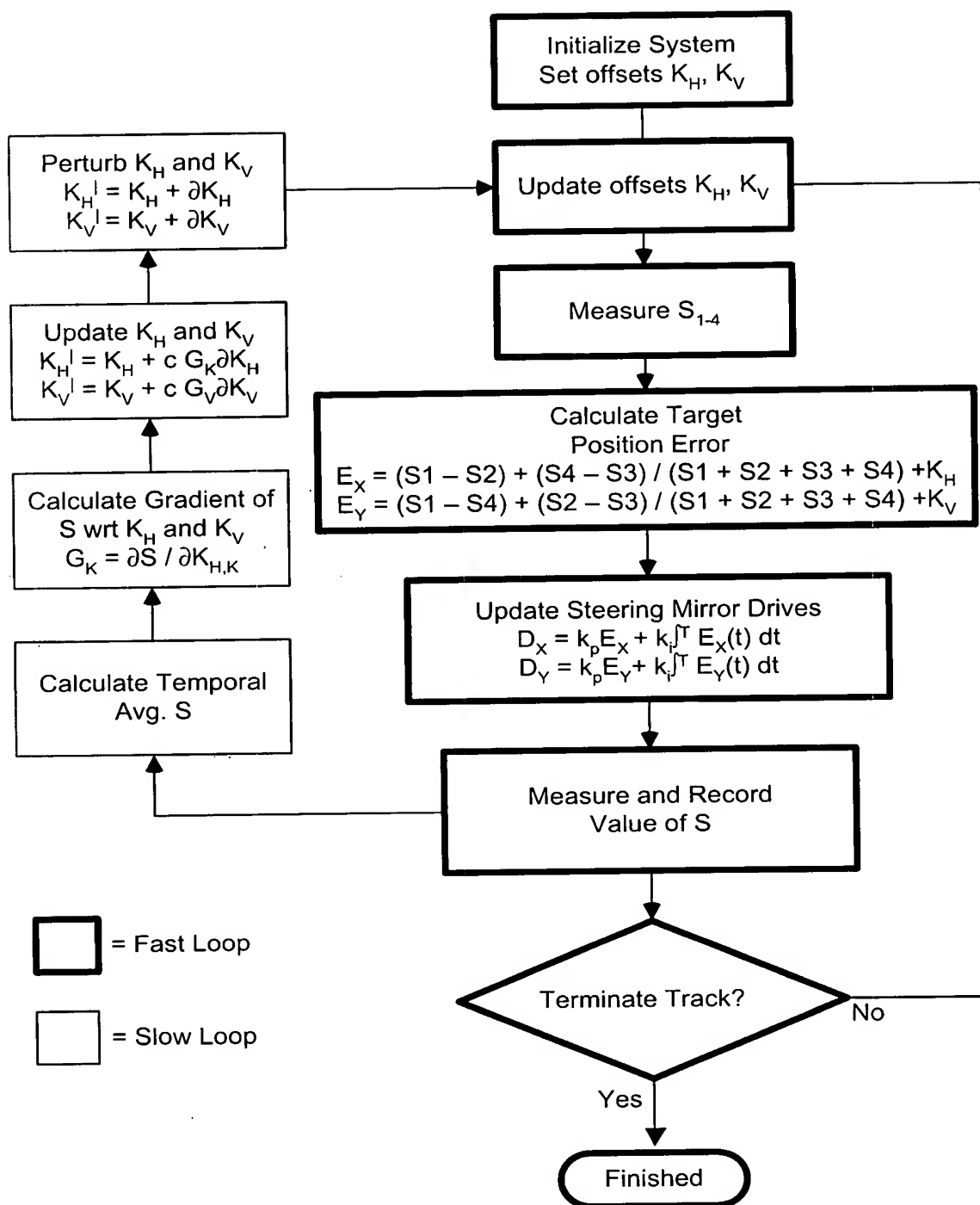
Receiver Proportional Control

FIG. 4D'



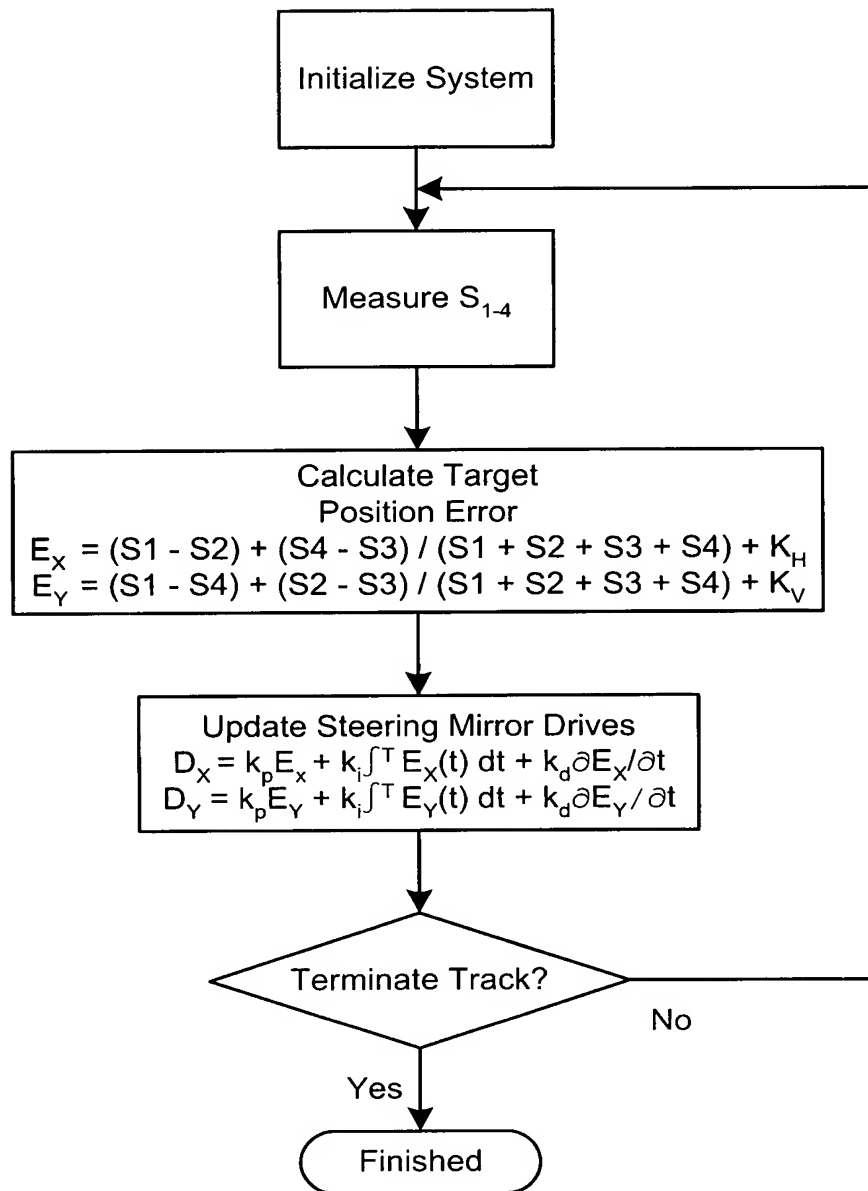
Proportional Plus Integral Control

FIG. 4E



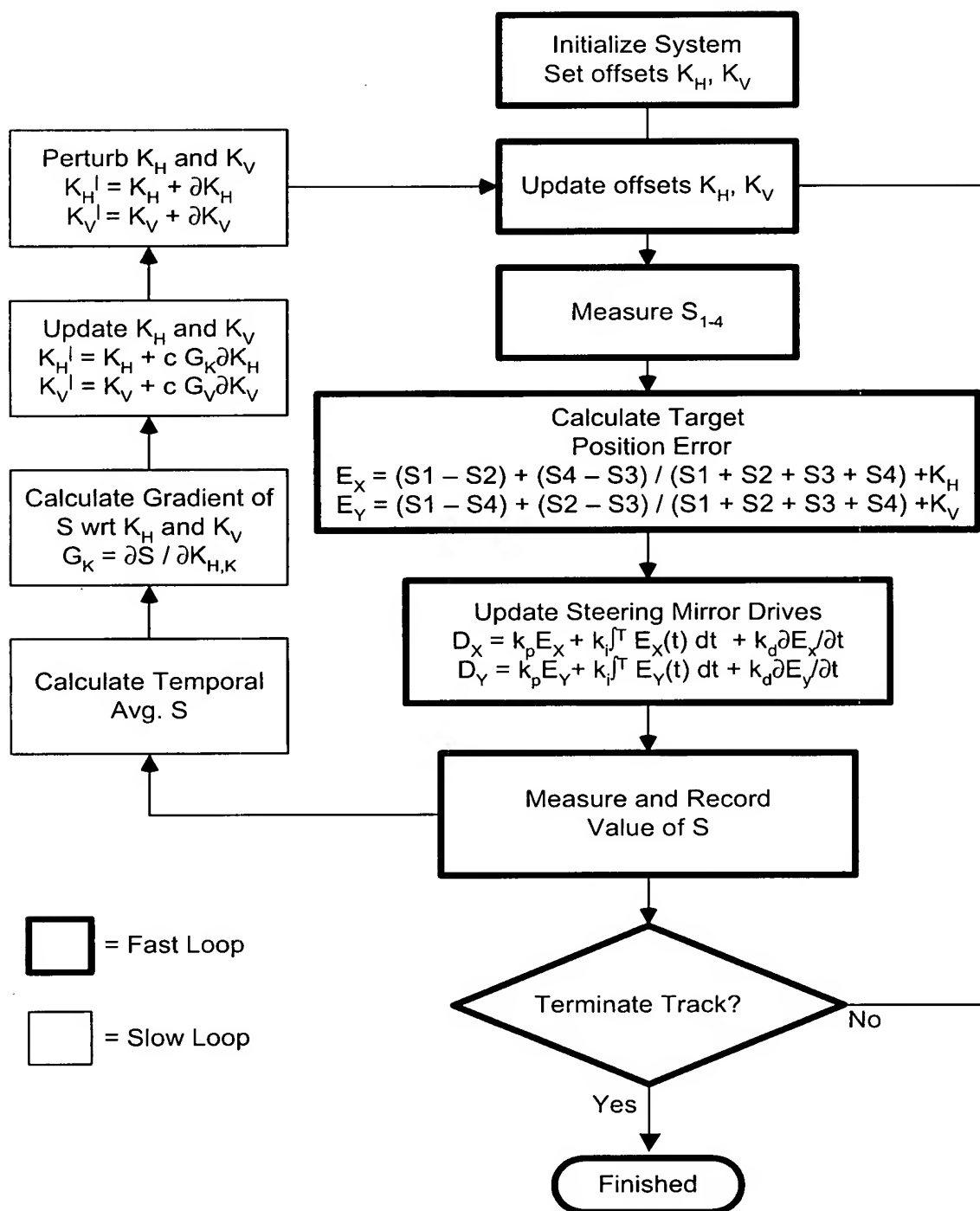
Receiver Proportional plus Integral Control

FIG. 4E'



Proportional Plus Integral Control Plus Derivative

FIG. 4F



Receiver Proportional plus Integral Control plus Derivative

FIG. 4F'

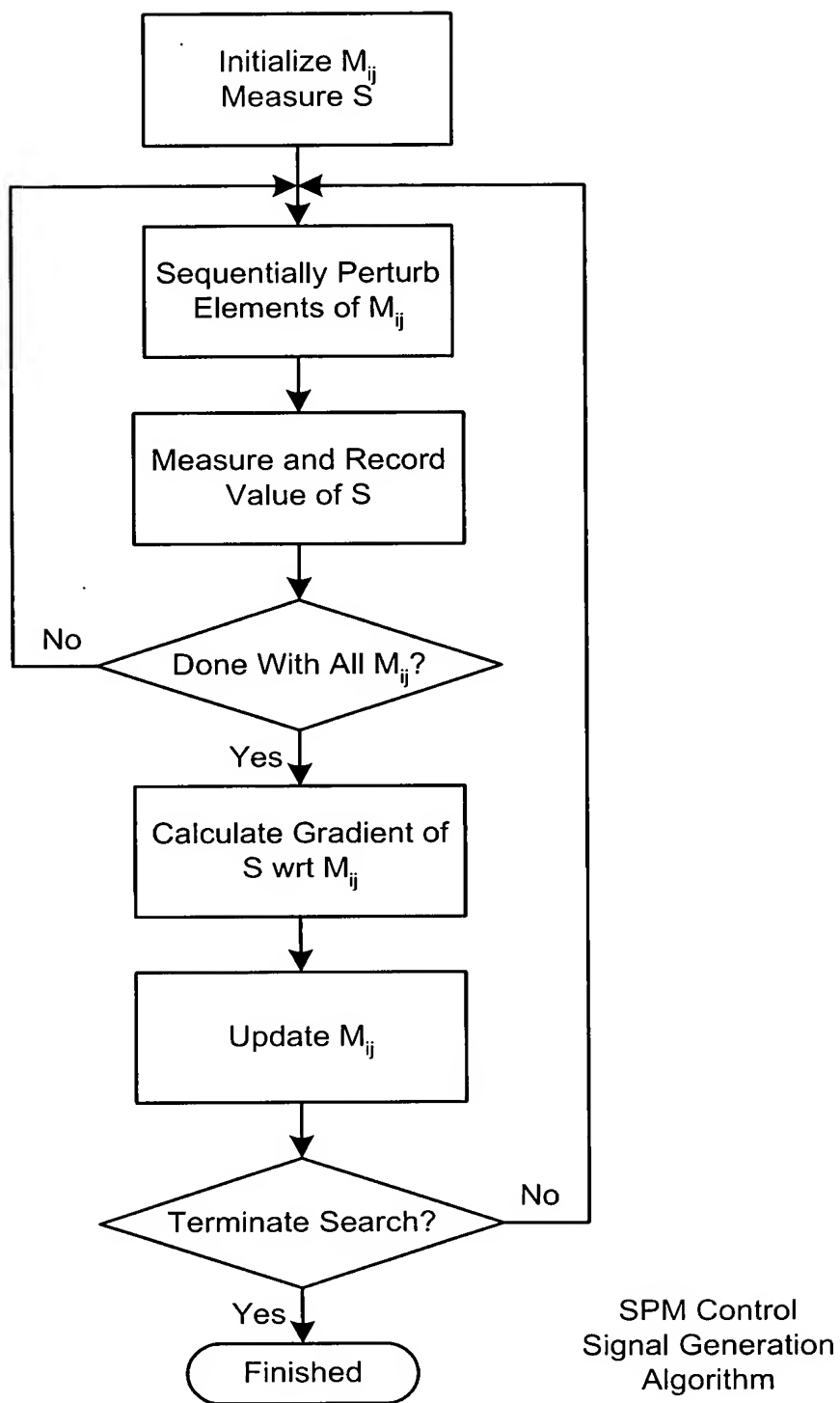


FIG. 5A

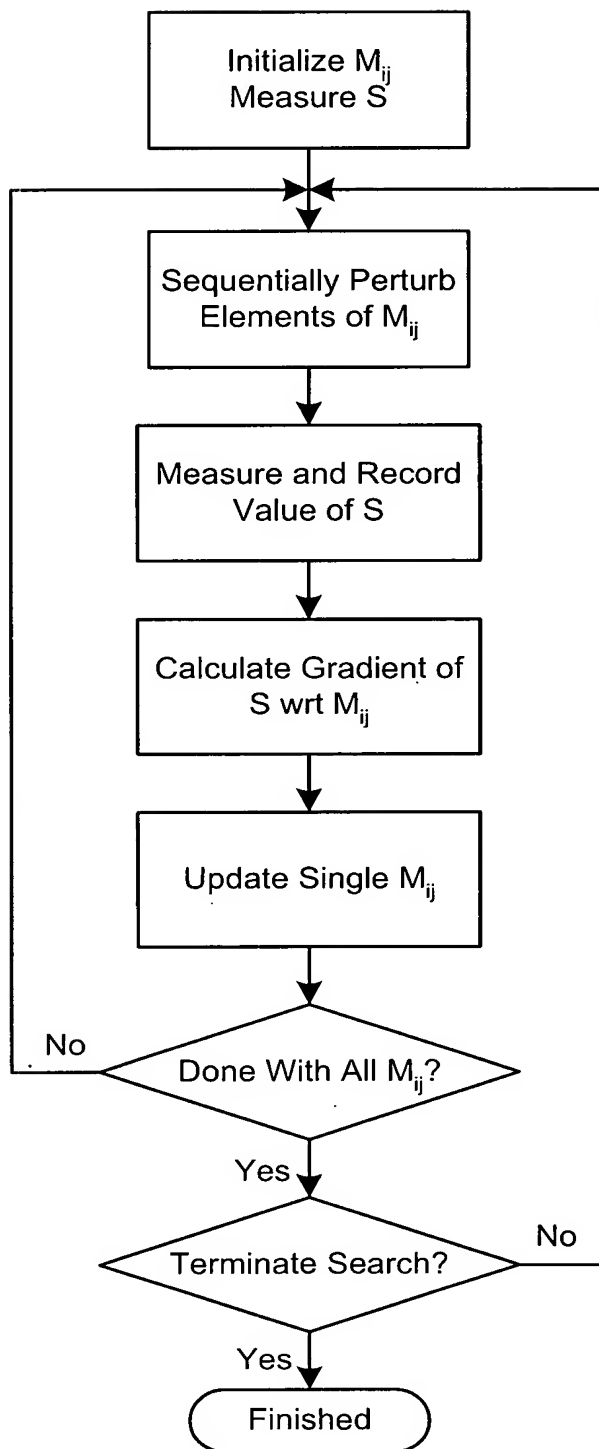


FIG. 5B

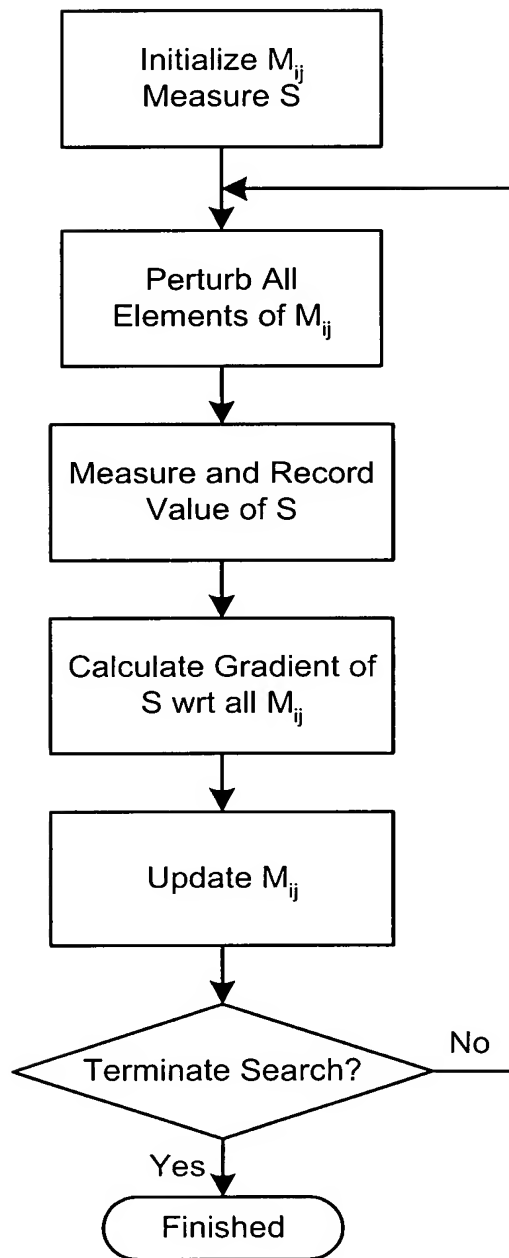


FIG. 5C

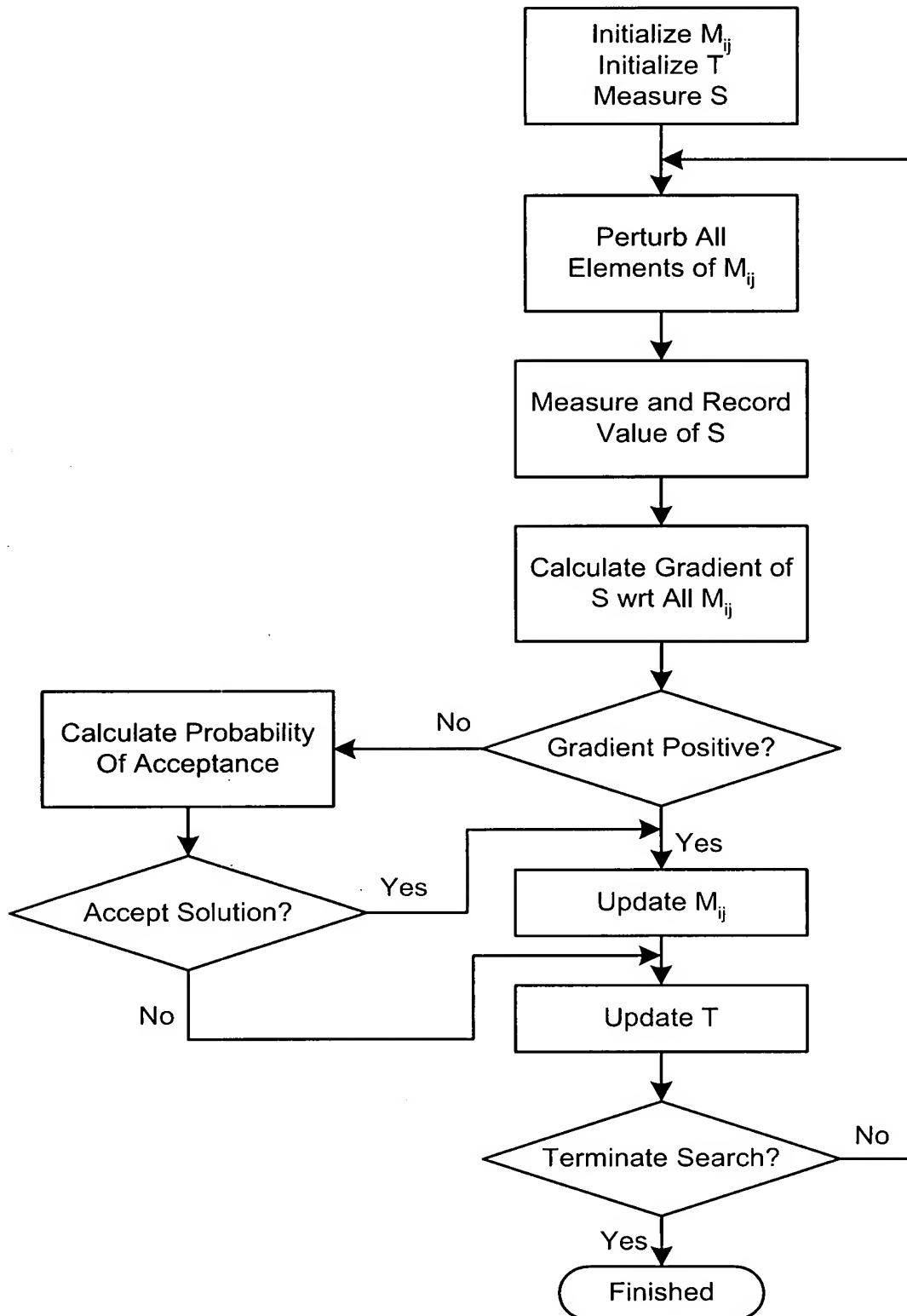


FIG. 5D

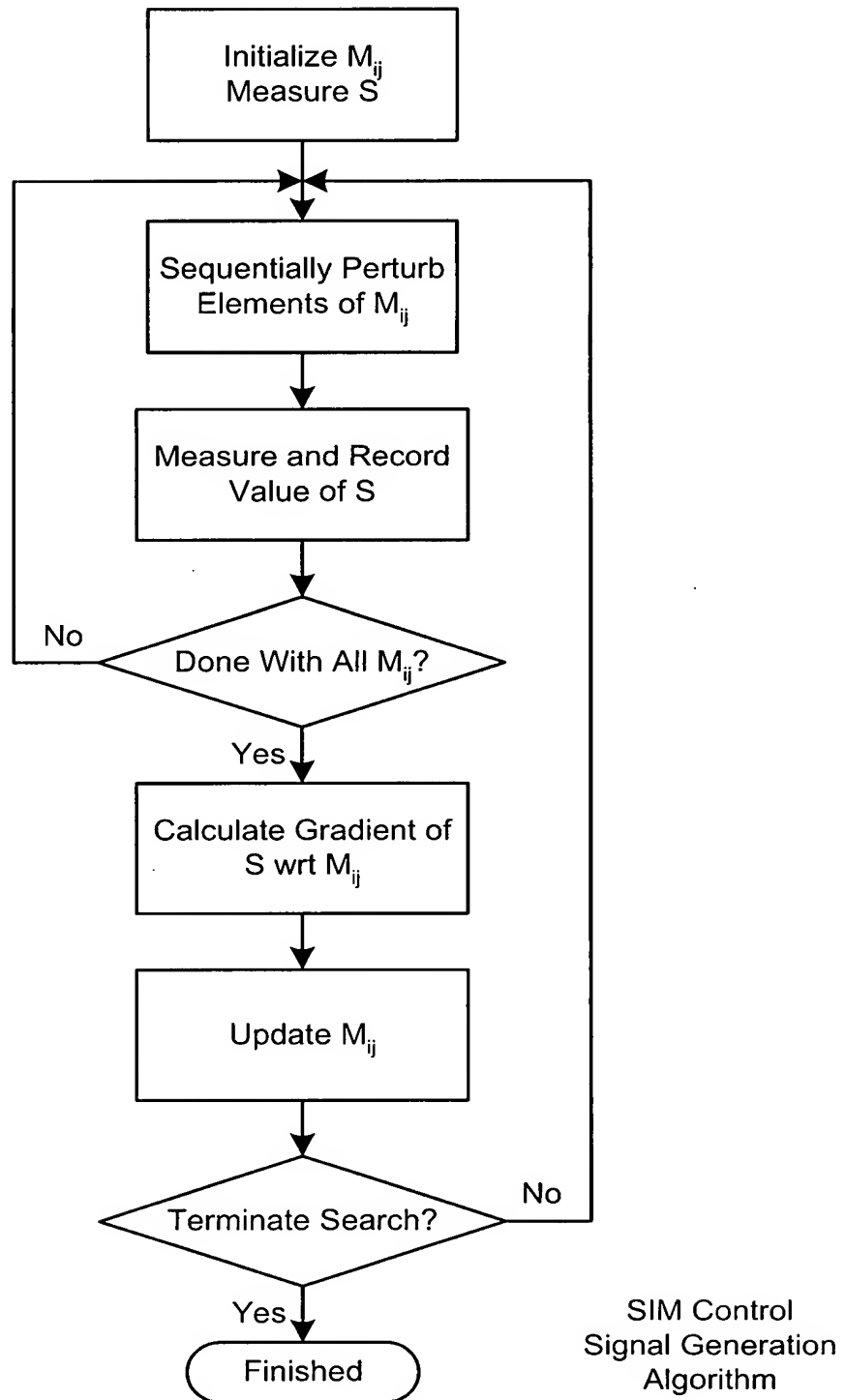


FIG. 6A

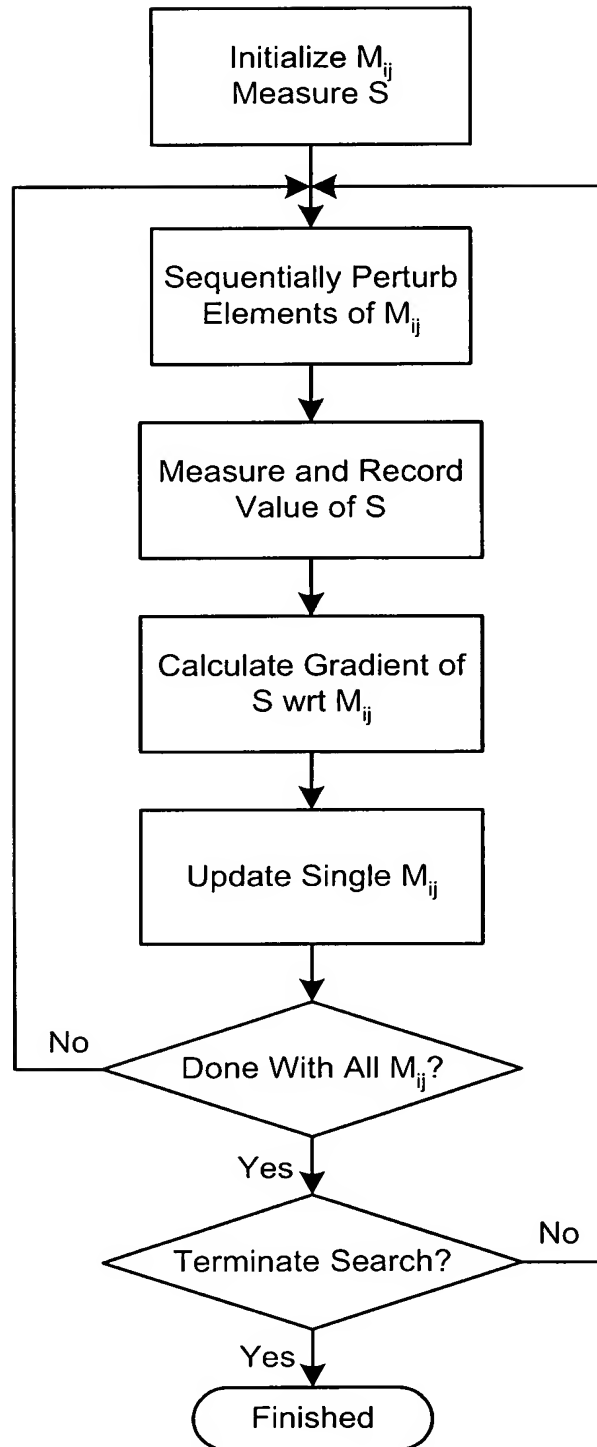


FIG. 6B

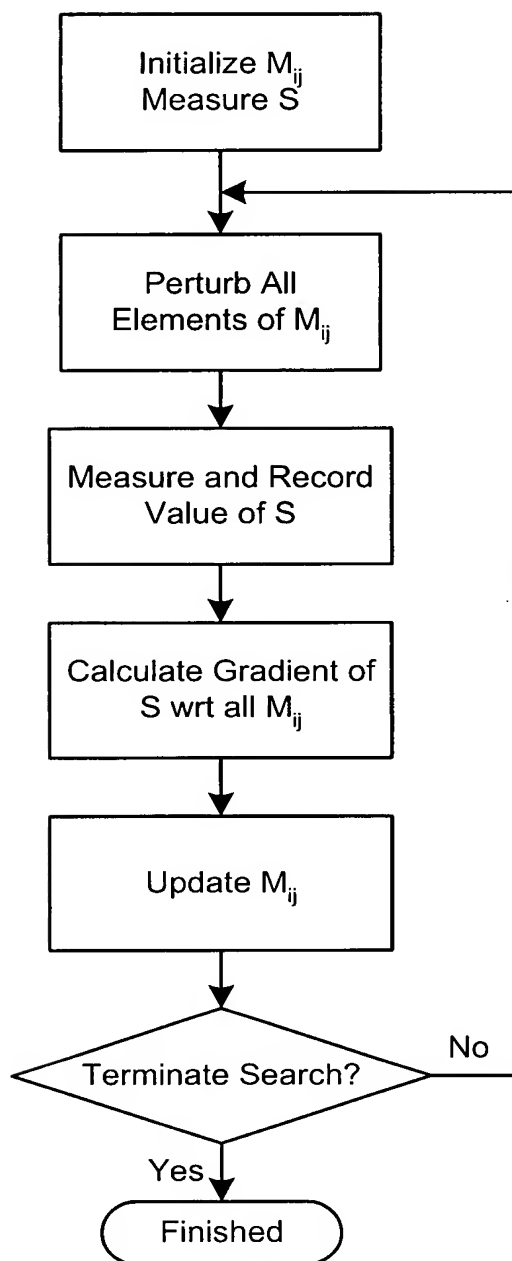


FIG. 6C

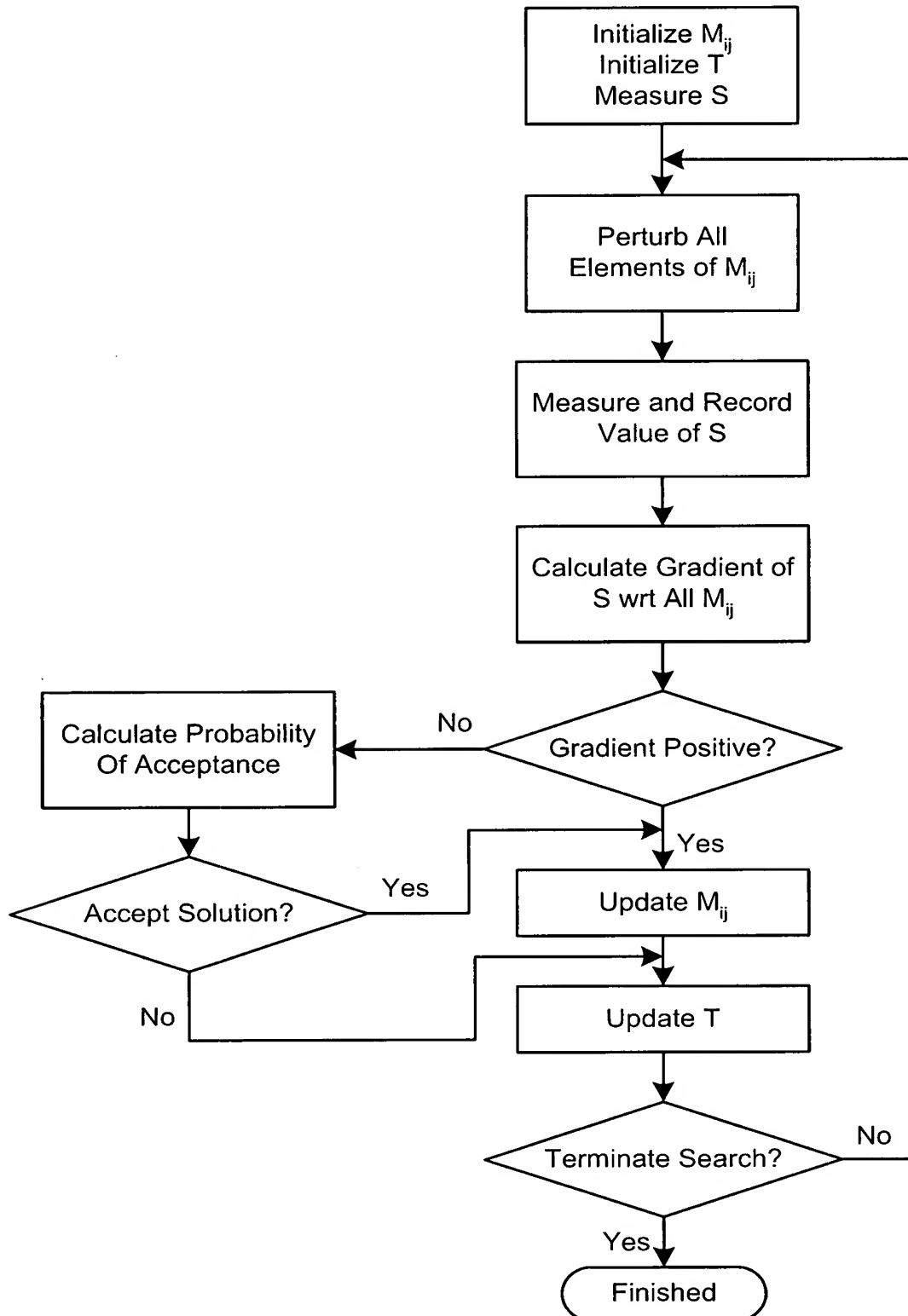


FIG. 6D

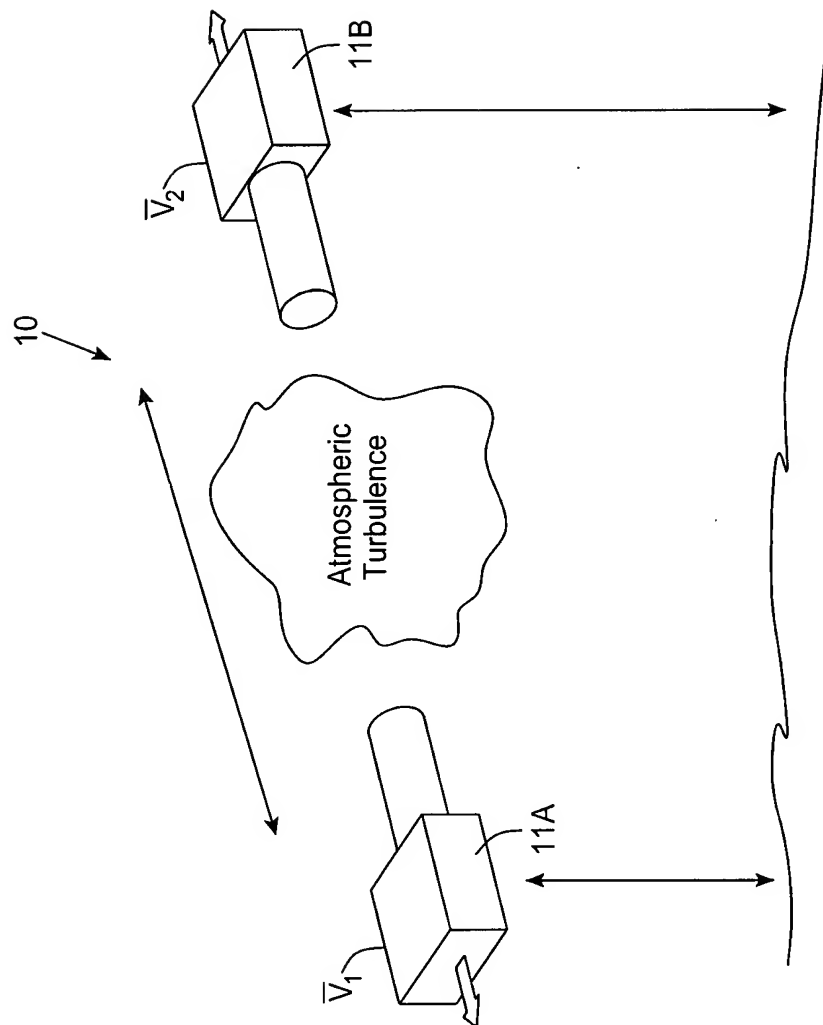


FIG. 7A

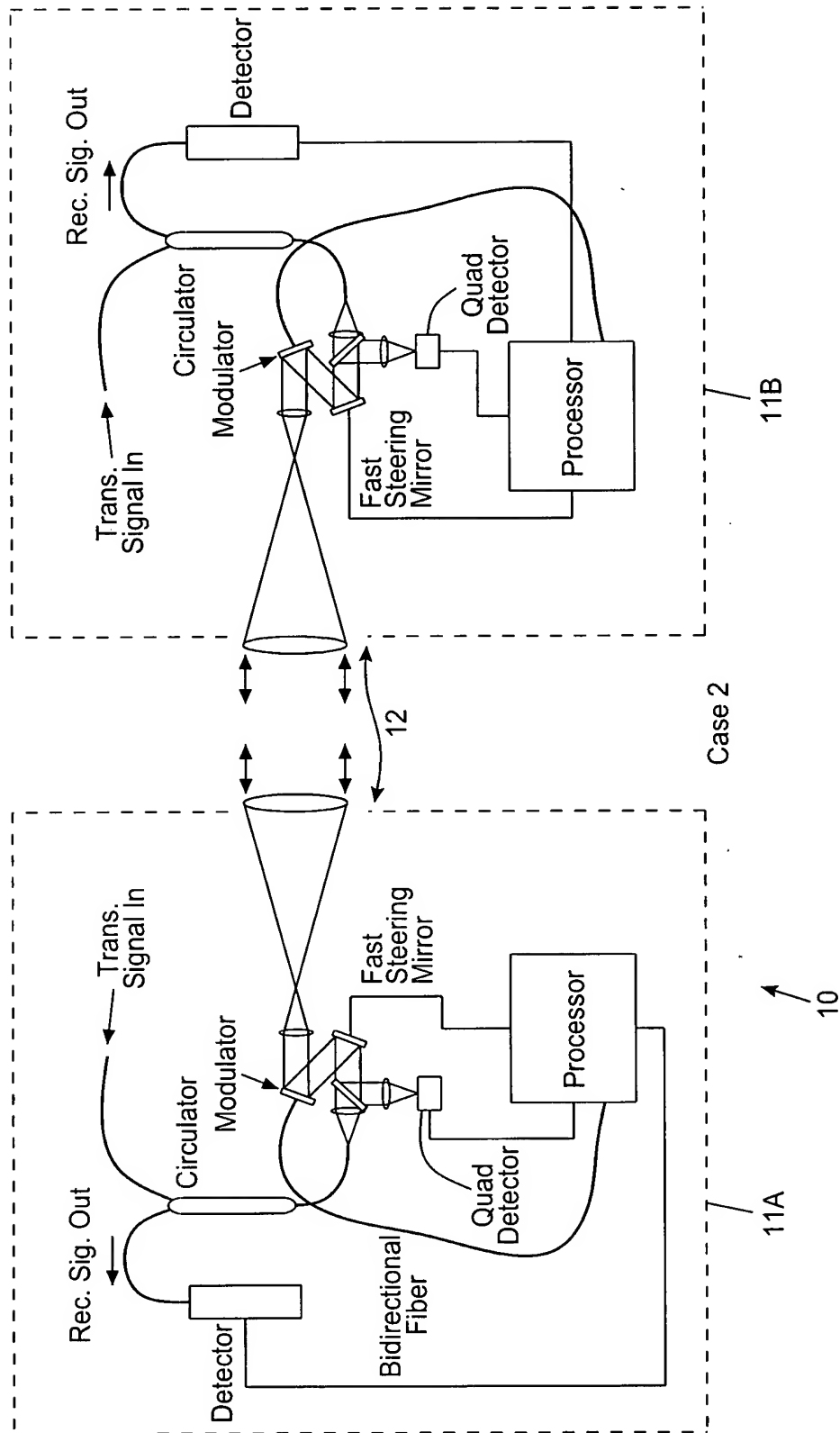


FIG. 7B

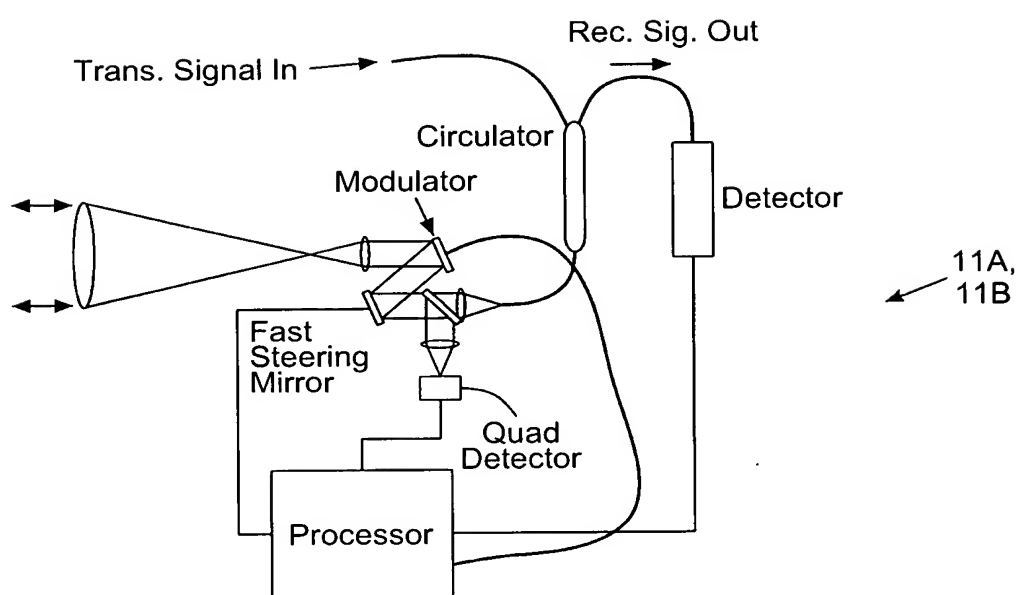


FIG. 7C

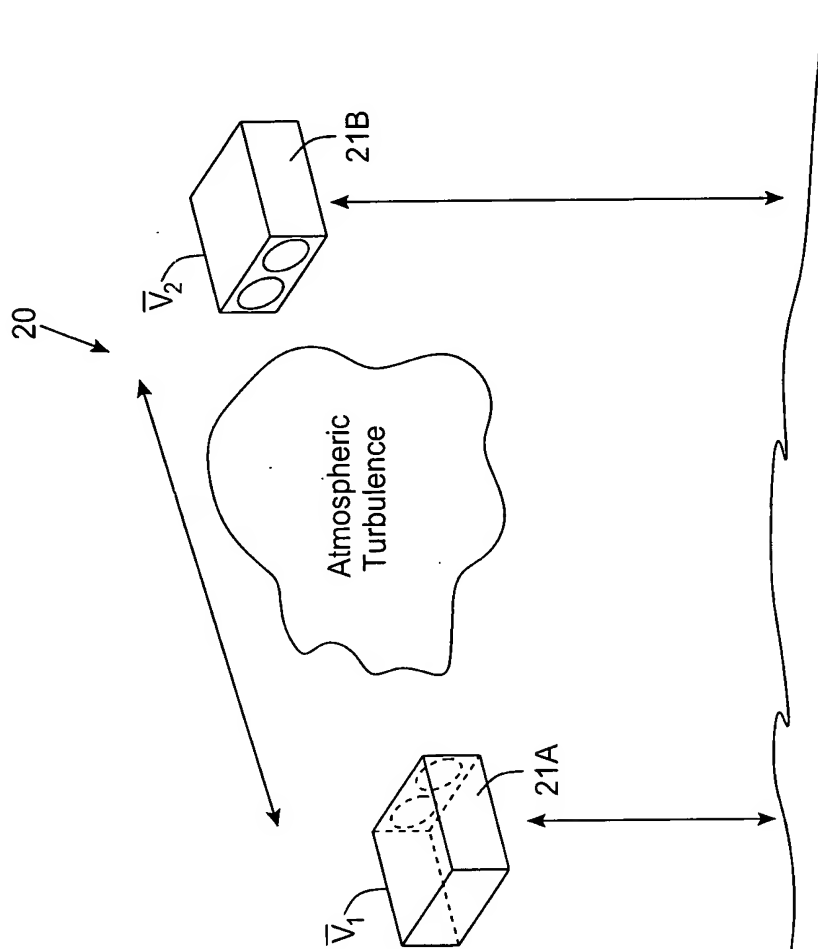


FIG. 8A

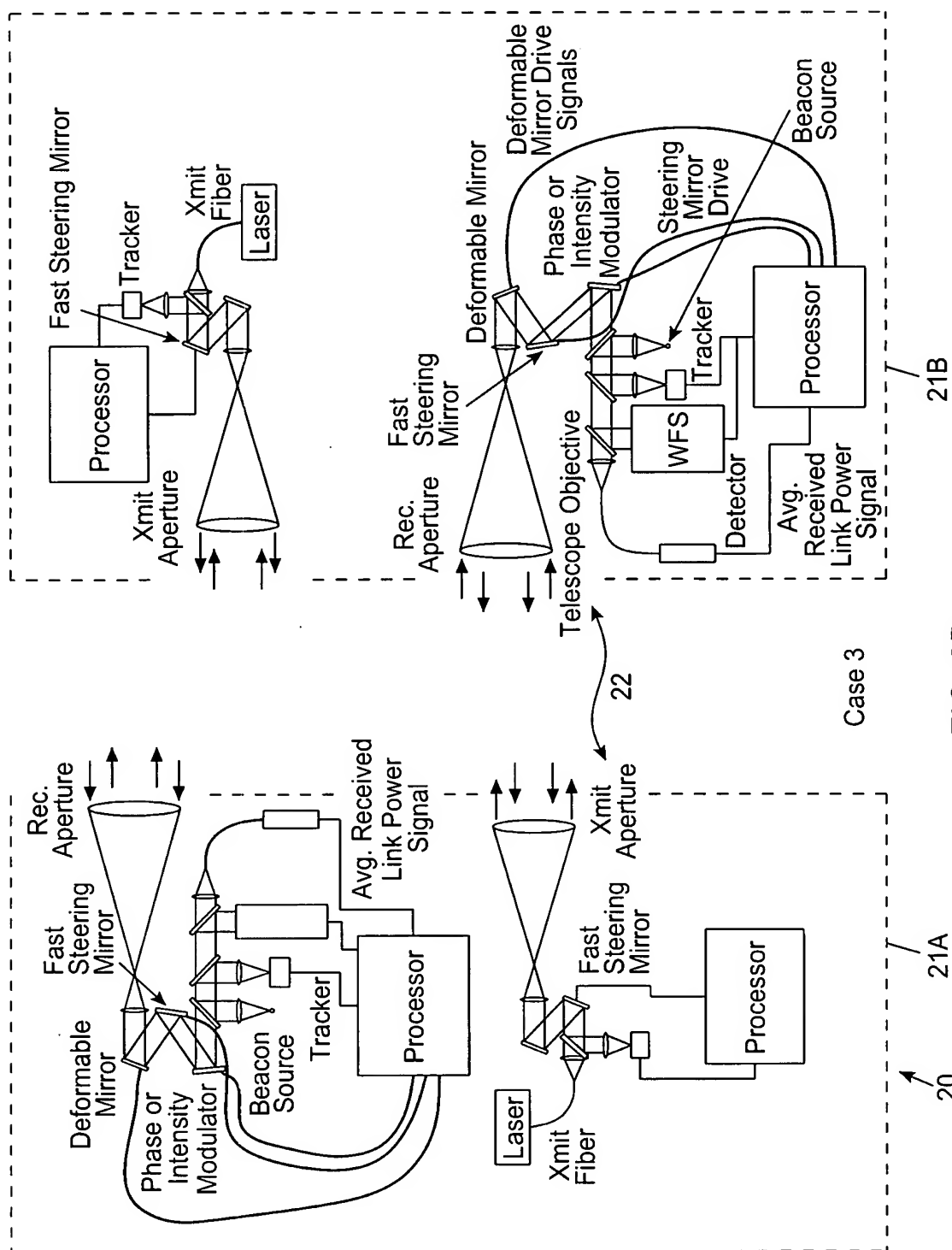


FIG. 8B

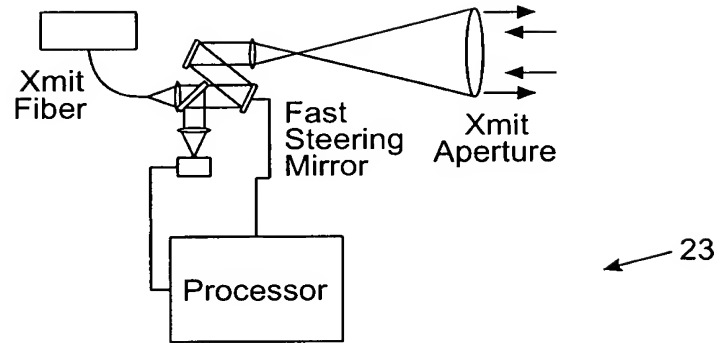


FIG. 8C

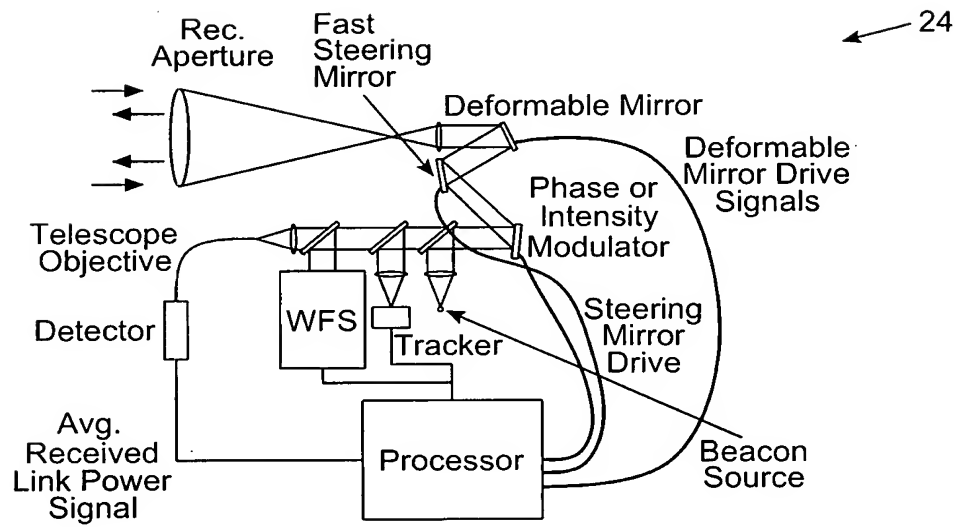
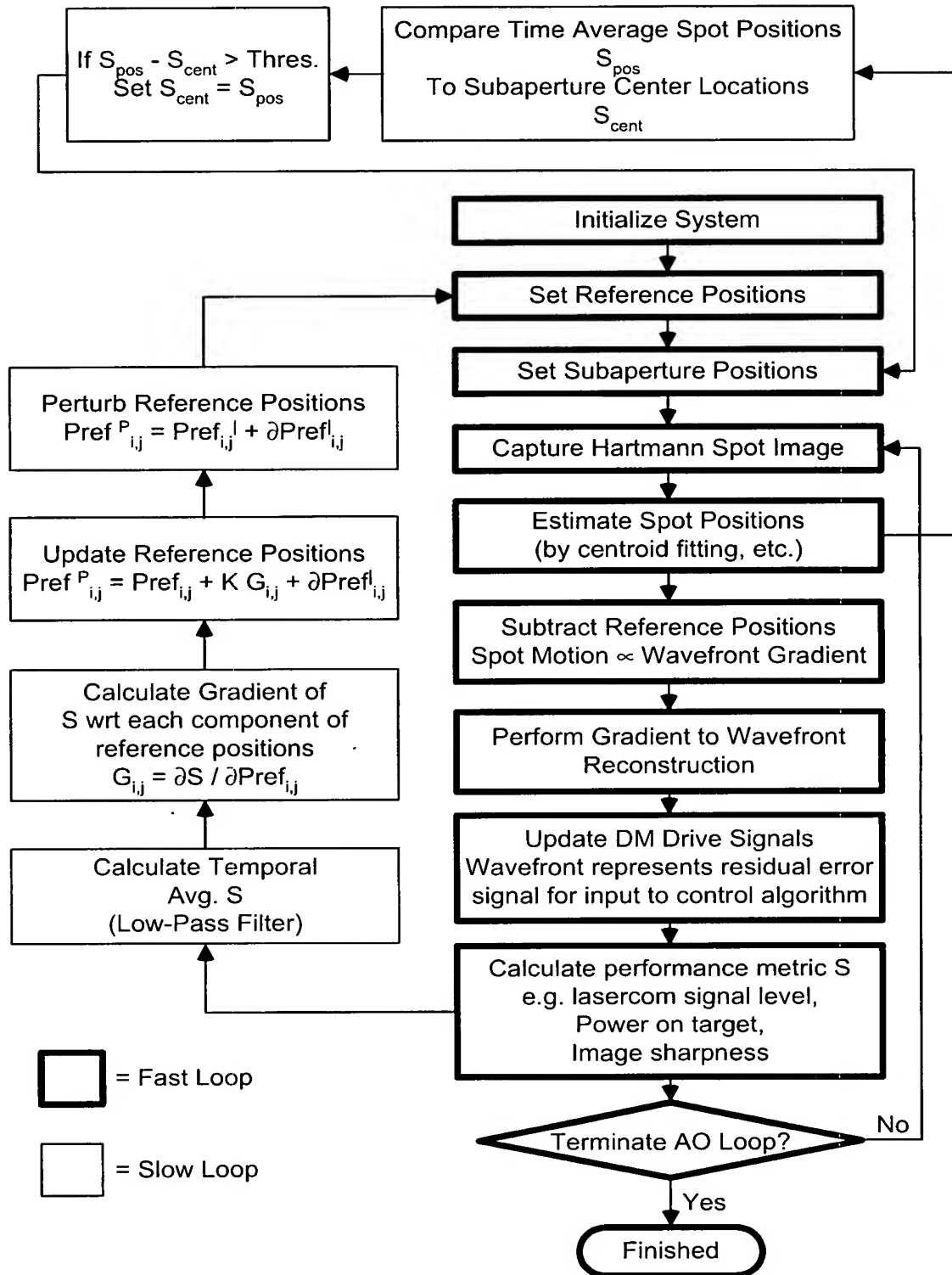
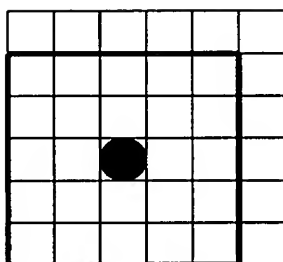


FIG. 8D



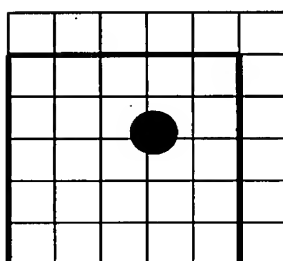
WF Control with Active Update of References

FIG. 8E



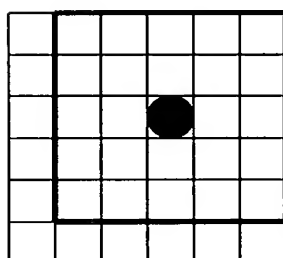
Spot near center of  
subaperture region

FIG. 8F1



Spot moving away  
from center of  
subaperture region

FIG. 8F2



When some  
threshold distance  
from center is  
crossed, redefine  
subaperture to re-  
center spot

FIG. 8F3

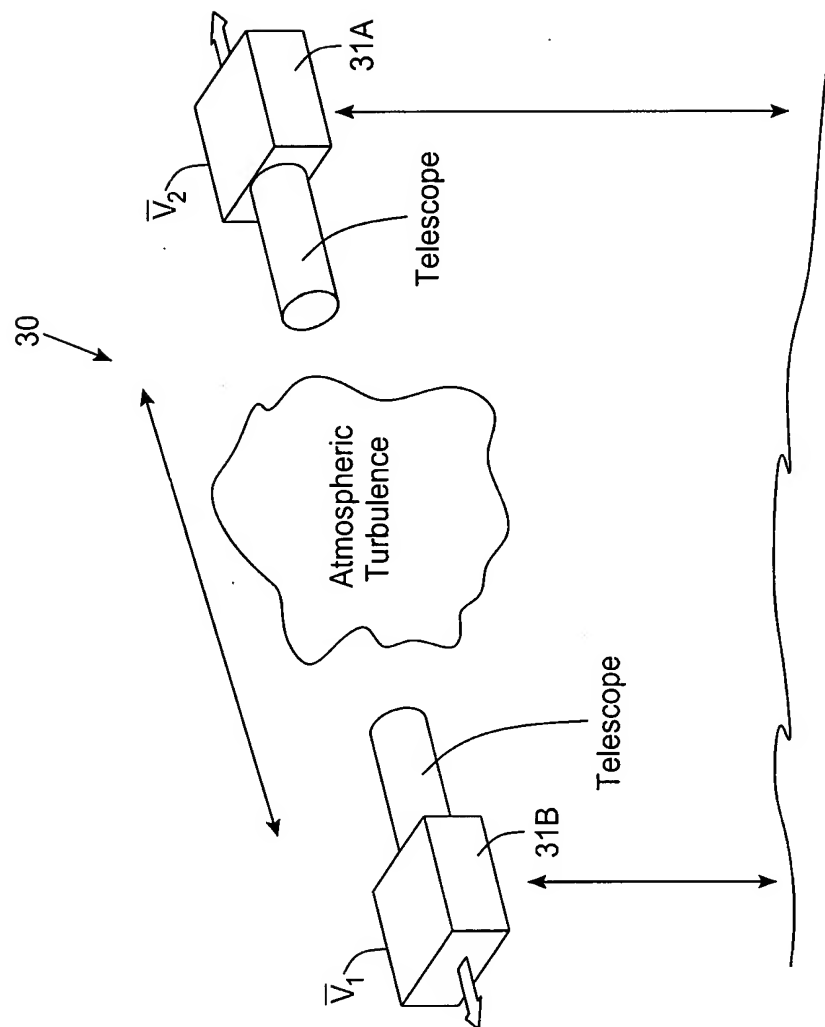
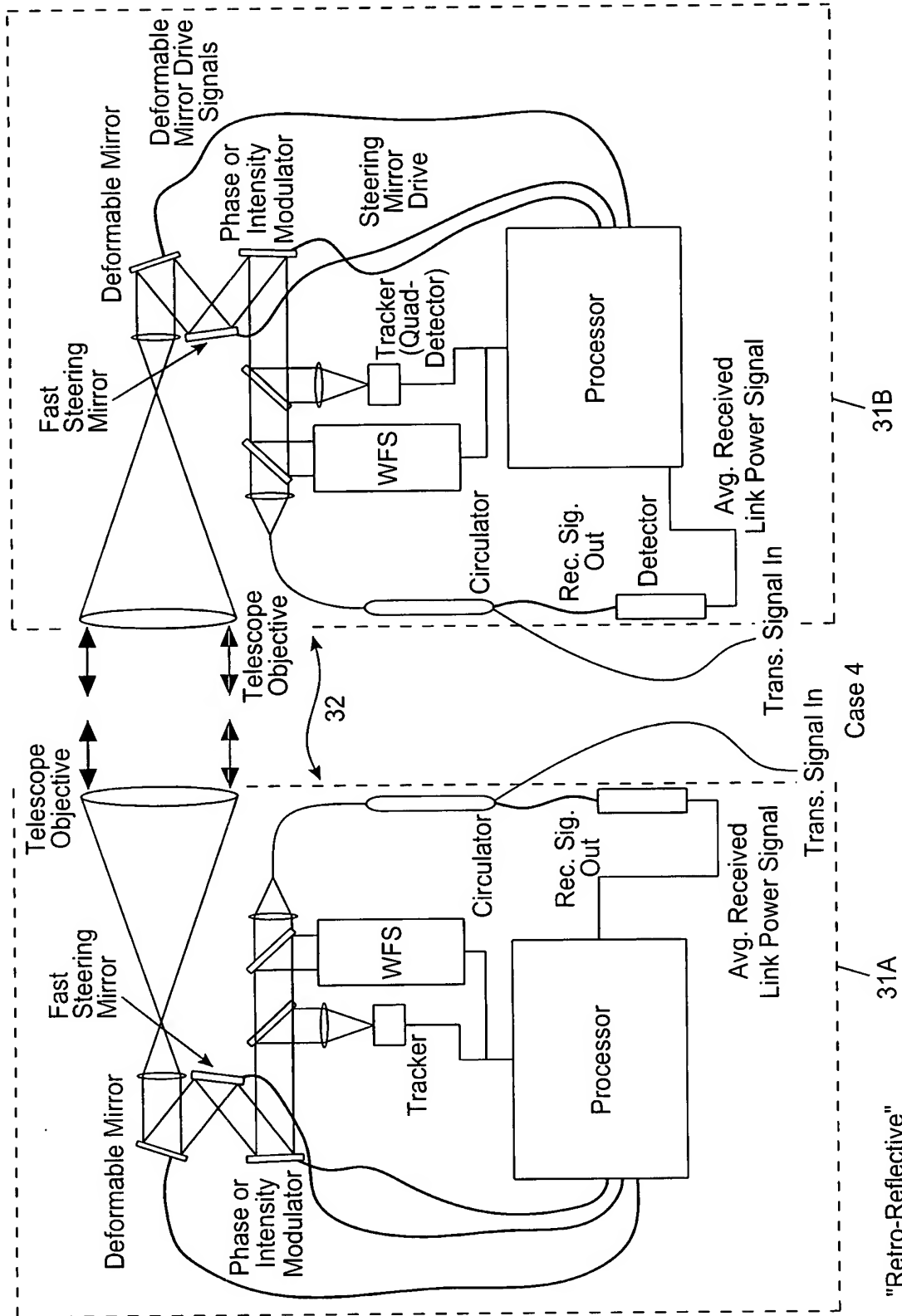


FIG. 9A



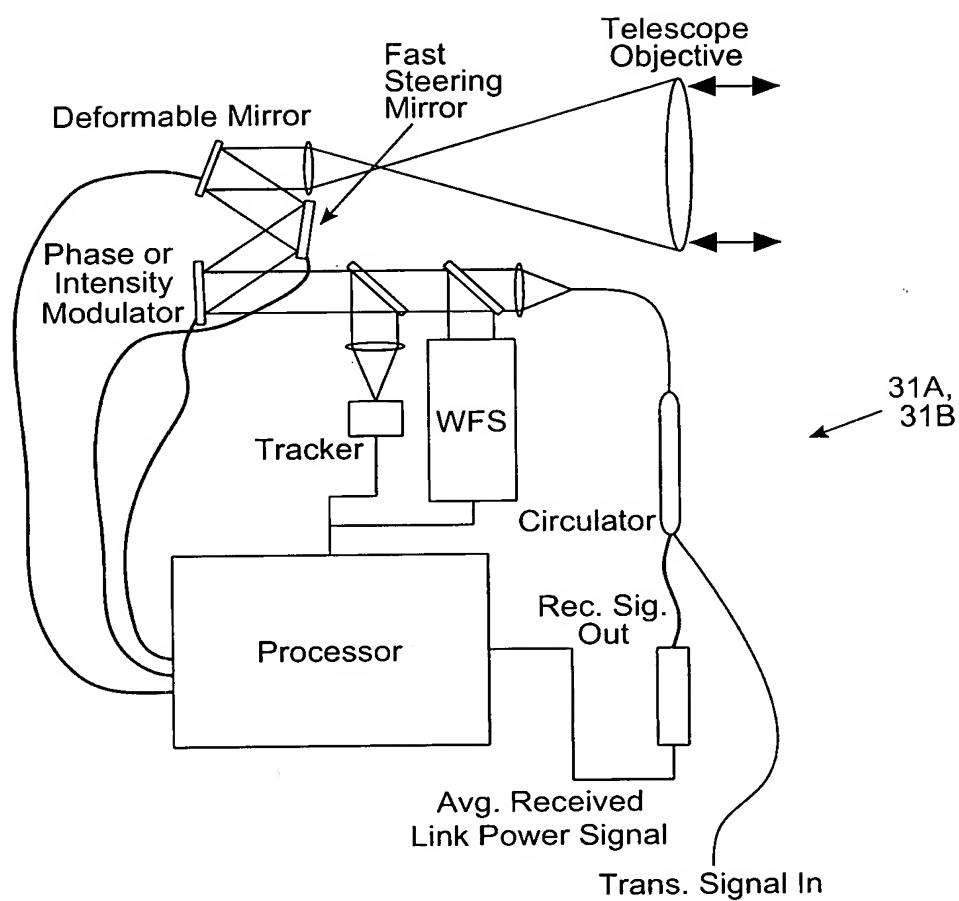


FIG. 9C

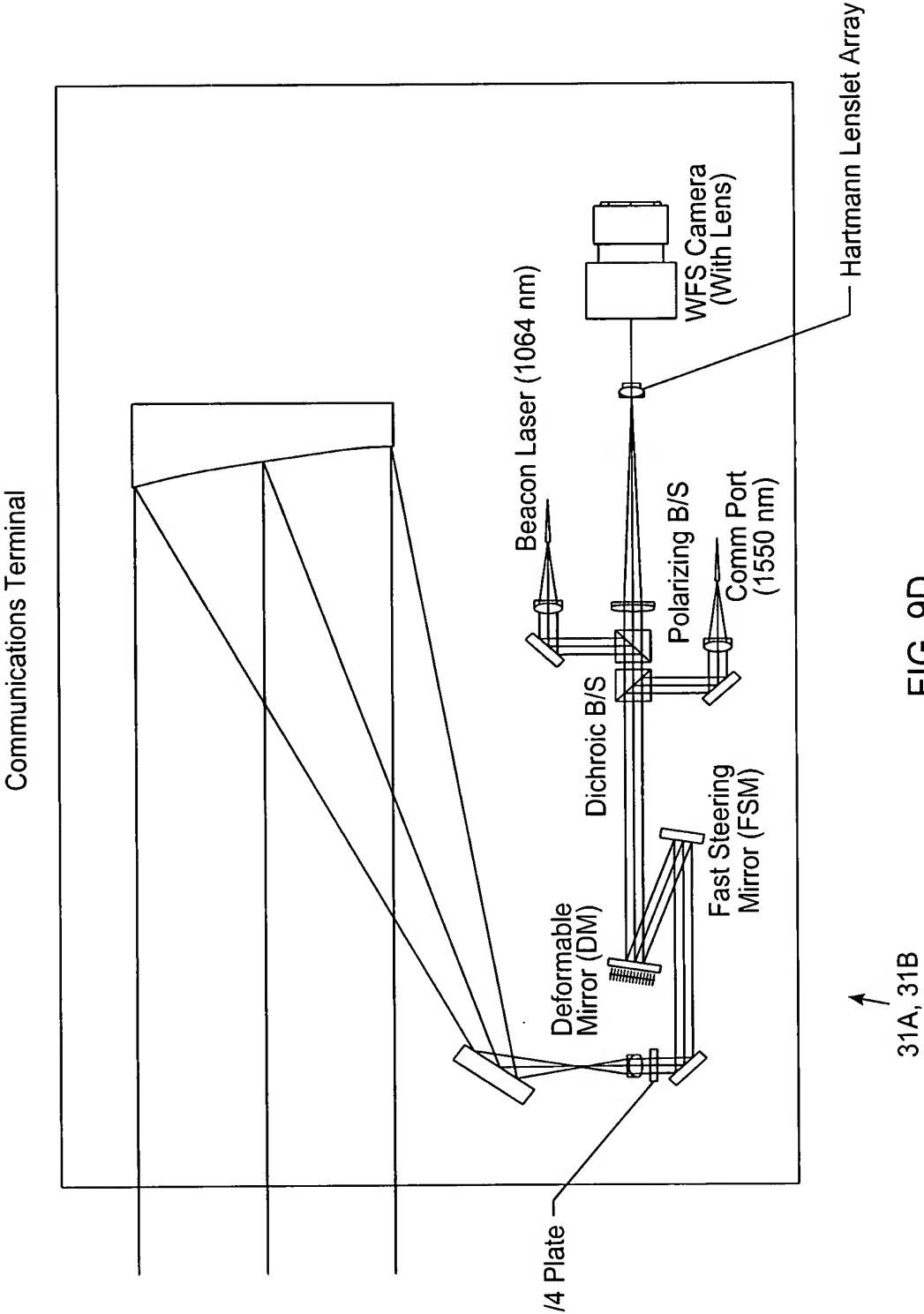


FIG. 9D

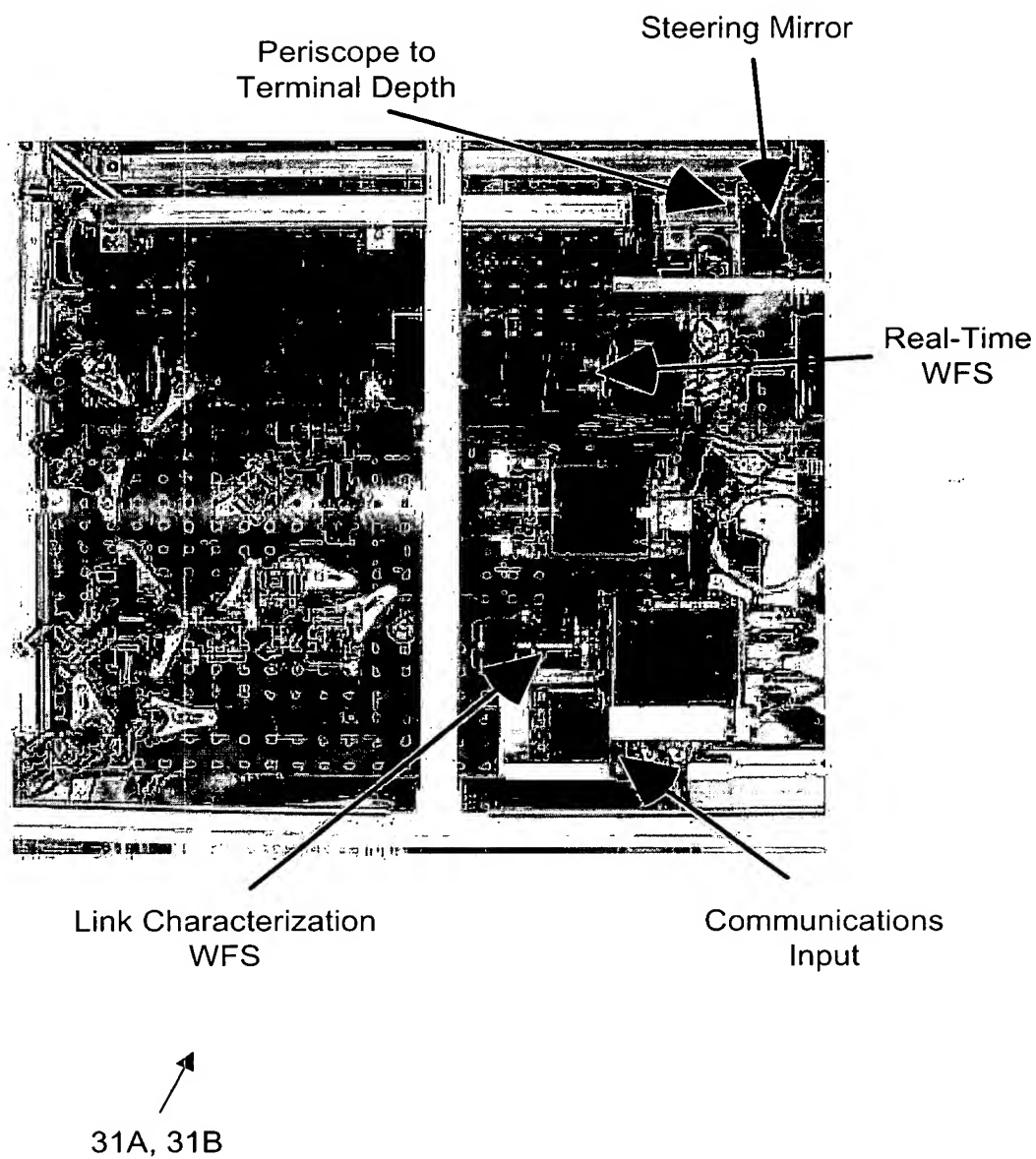
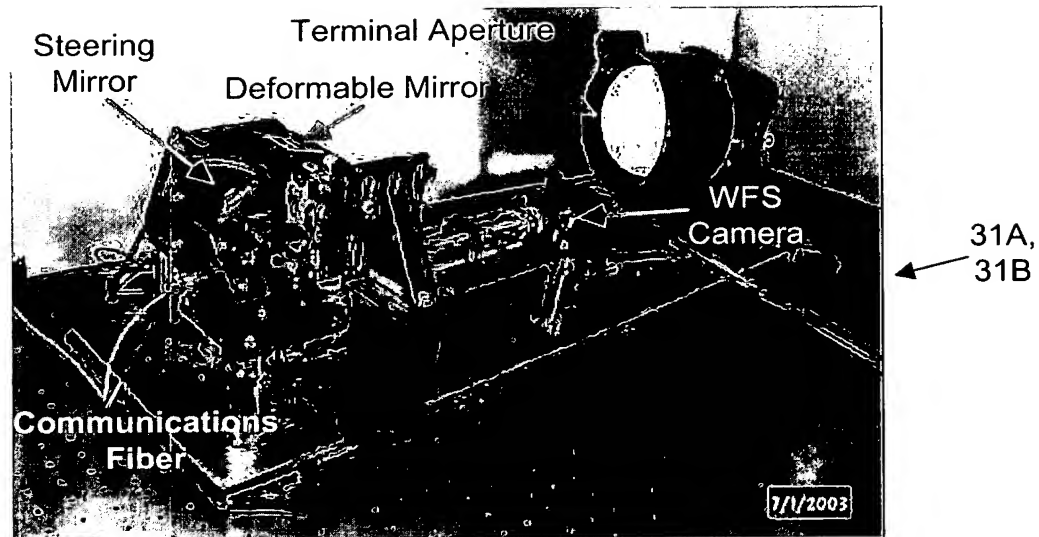


FIG. 9E



Compact laser communications terminal with 15cm aperture. This terminal has both a fast steering mirror and deformable mirror for atmospheric compensation. This terminal is set up as either a transmitter or receiver, with a separate fiber port for a tracking and AO beacon laser source (hidden by the DM mount).

These are both laser comm. terminals with traditional adaptive optics. A terminal with fade prevention would look similar. Note that these use reflecting telescopes (the one on the top has an 8 inch Schmidt Cassegrain telescope on the other side of the optical breadboard. In the schematic drawings a refracting telescope is shown for simplicity. Either can be used in practice.

FIG. 9F

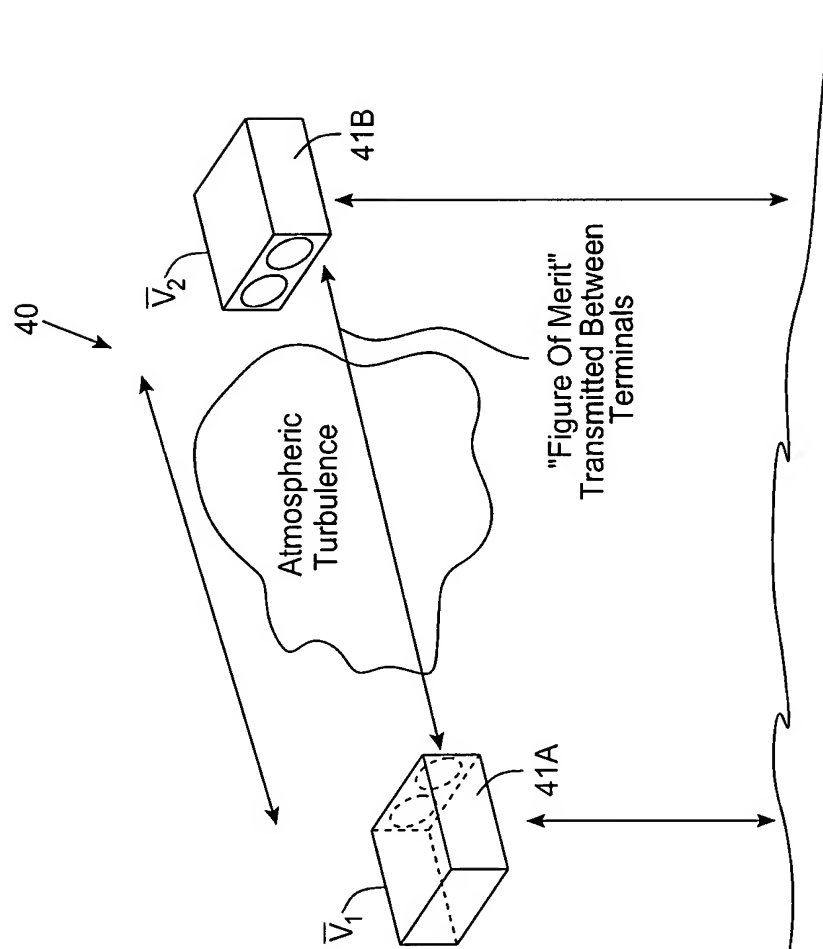


FIG. 10A

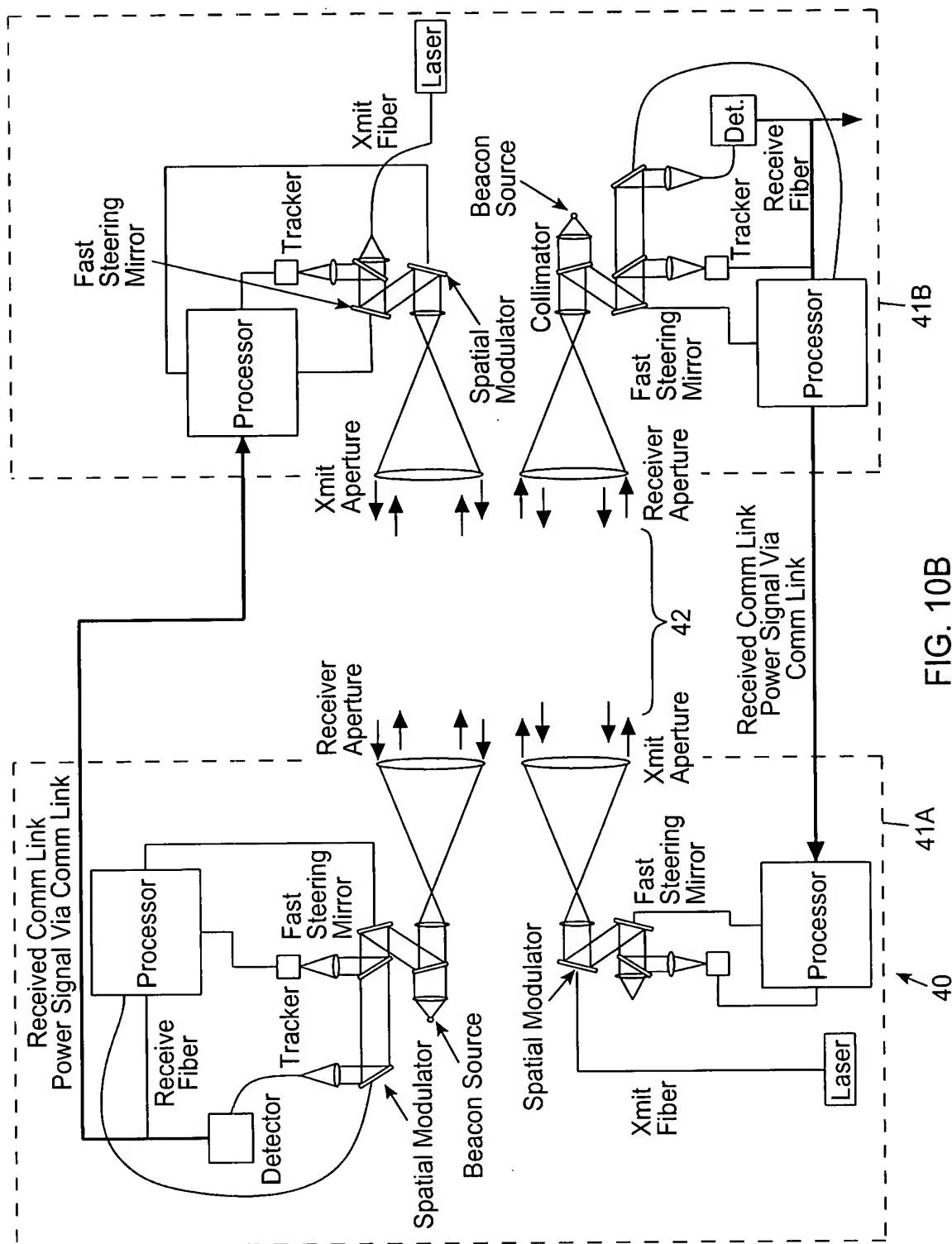


FIG. 10B